A Feasibility Study on the Opening of a Wetlands Mitigation Bank in Restored, Enhanced and Preserved Wetlands Adjacent to the Sawmill Branch Canal in Summerville, South Carolina

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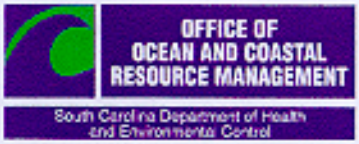

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Acknowledgement

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Introduction

The Sawmill Branch is a channelized creek basin, which drains into the upper Ashley River, South Carolina (**Figure 1**). The branch flows from approximately ½ mile north of Old Summerville Road in Berkeley County, South Carolina to Bacons Bridge Road in Summerville (Dorchester County), SC where it becomes known as Dorchester Creek. At the continuation of Sawmill Branch, Dorchester Creek is also a channelized canal, which flows into the Ashley River at Old Fort Dorchester State Park. Bacons Bridge Road, (S.C. Hwy 165) brackets the area discussed in this feasibility study, it includes an area of 3,297 acres (**Figure 2**).

During the 1960's the US Army Corps of Engineers (USACE) altered the natural creek basin of the Sawmill Branch by deepening and straightening the channel. The purpose of this manipulation was to decrease the potential for flooding in the Town of Summerville, increase land areas available for development and reduce insect pest populations. During the dredging process, spoil was placed on the natural levees and created man made berms now flanking Sawmill Branch and Dorchester Creek. This had the effect of isolating the wetlands adjacent to the canal, which now effectively served as a large drainage ditch for the Town of Summerville. Since there was little connectivity left between the cypress-hardwood bottom wetlands and the canal itself, there were over-berm-flooding problems during major rain events. This flooding carried poor quality runoff into the canal and subsequently into the Ashley River.

The solution to this problem of over-berm flooding was to bypass the wetland areas by installing large diameter pipes under the berms, thus causing quick drainage. In some places drainage ditches were dug directly from the developed areas to these pipes where runoff could discharge directly into the canal. The net effect of this stormwater drainage system was the disruption of natural hydrology into the normally semi-permanently flooded cypress-hardwood

Sawmill Branch Canal

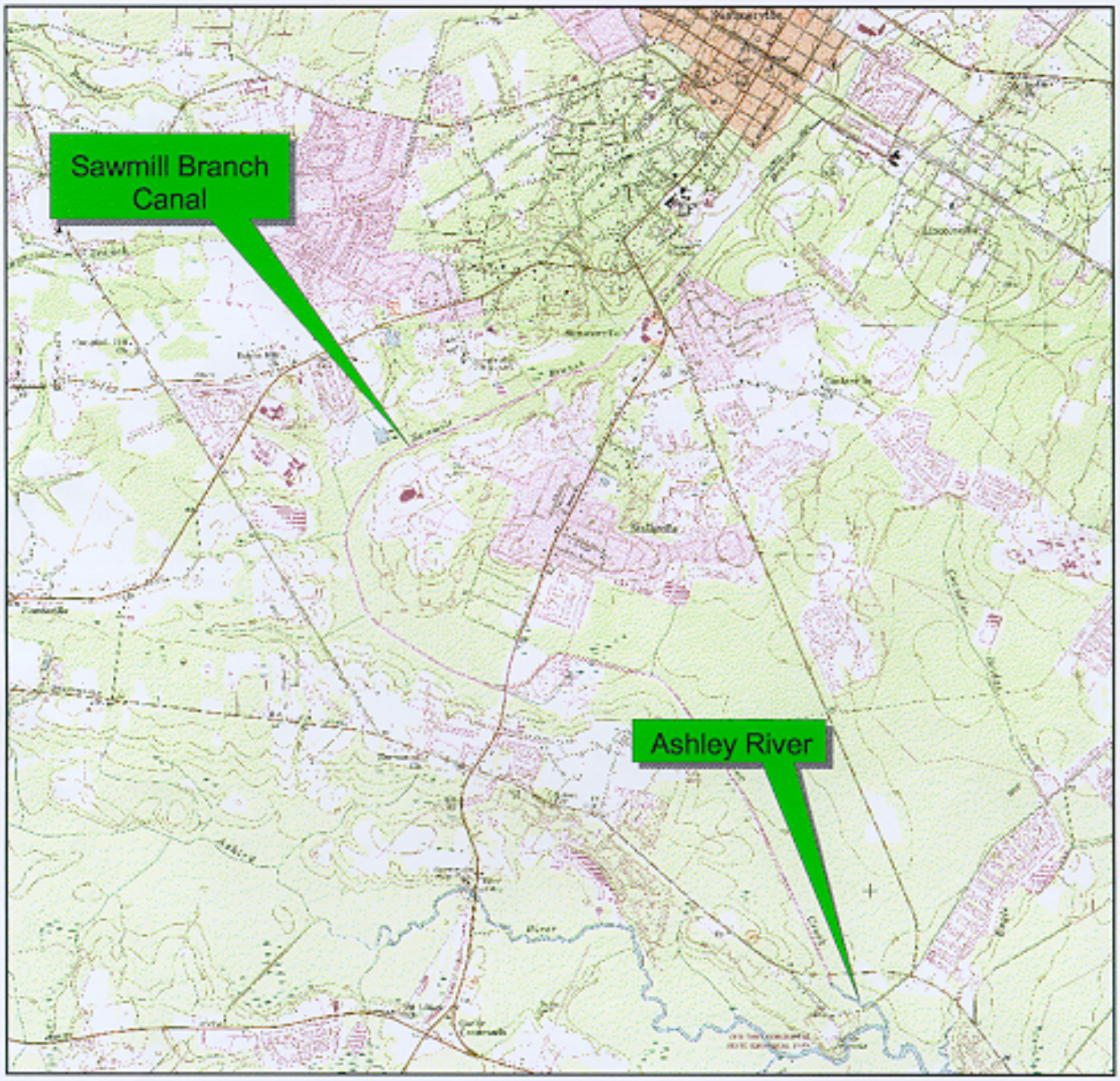

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Figure 1.

Sawmill Branch Study Area

Legend

1994 NAPP Image

Study Area Boundary

0 0.1 0.2 0.3 0.4 0.5 Miles

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Figure 2.

bottom wetlands. The culverts and ditches carry water directly to the canal and do not allow any significant residence time for water in the wetland areas. This water bypass has resulted in wetlands that are functionally degraded and large areas no longer fit the USACE definition of wetlands **(Appendix A)**. The bypass of the wetlands by storm water allows sediments, nutrients, organic matter and non-point source pollutants to wash directly into the Sawmill Branch Canal, Dorchester Creek and the Ashley River.

Residential and commercial developments have accelerated in the area of the Sawmill Branch Canal since the alteration of the branch. During the course of this development, additions to the storm water system were installed which also cause water to bypass the wetlands. These bypassed wetlands once functioned to filter sediment and pollutants before the water entered the branch and ultimately the Ashley River.

The Town of Summerville and Dorchester County have continued to grow in residential population and in number of commercial and industrial enterprises. As this trend continues, there will be pressure to develop more open lands, which currently contain wetlands. The potential impacts to wetlands will have to be mitigated under the conditions of Section 404 of the Clean Water Act as administered by the USACE.

One future development that is planned to be completed by the year 2005 is the extension of the Berlin G. Myers Parkway, along the north edge of the Sawmill Branch near the Summerville Country Club **(Figure 3)** (Clair and Halder pers. comm). This South Carolina Department of Transportation (SCDOT) project and others may impact numerous acres of wetlands in the area. They will cause a need for compensatory wetland mitigation. One option to aid developers in obtaining permits is the purchase of mitigation credits from a mitigation bank. The Sawmill Branch Canal presents a feasible opportunity for natural resource

Proposed Berlin G. Meyers Extension

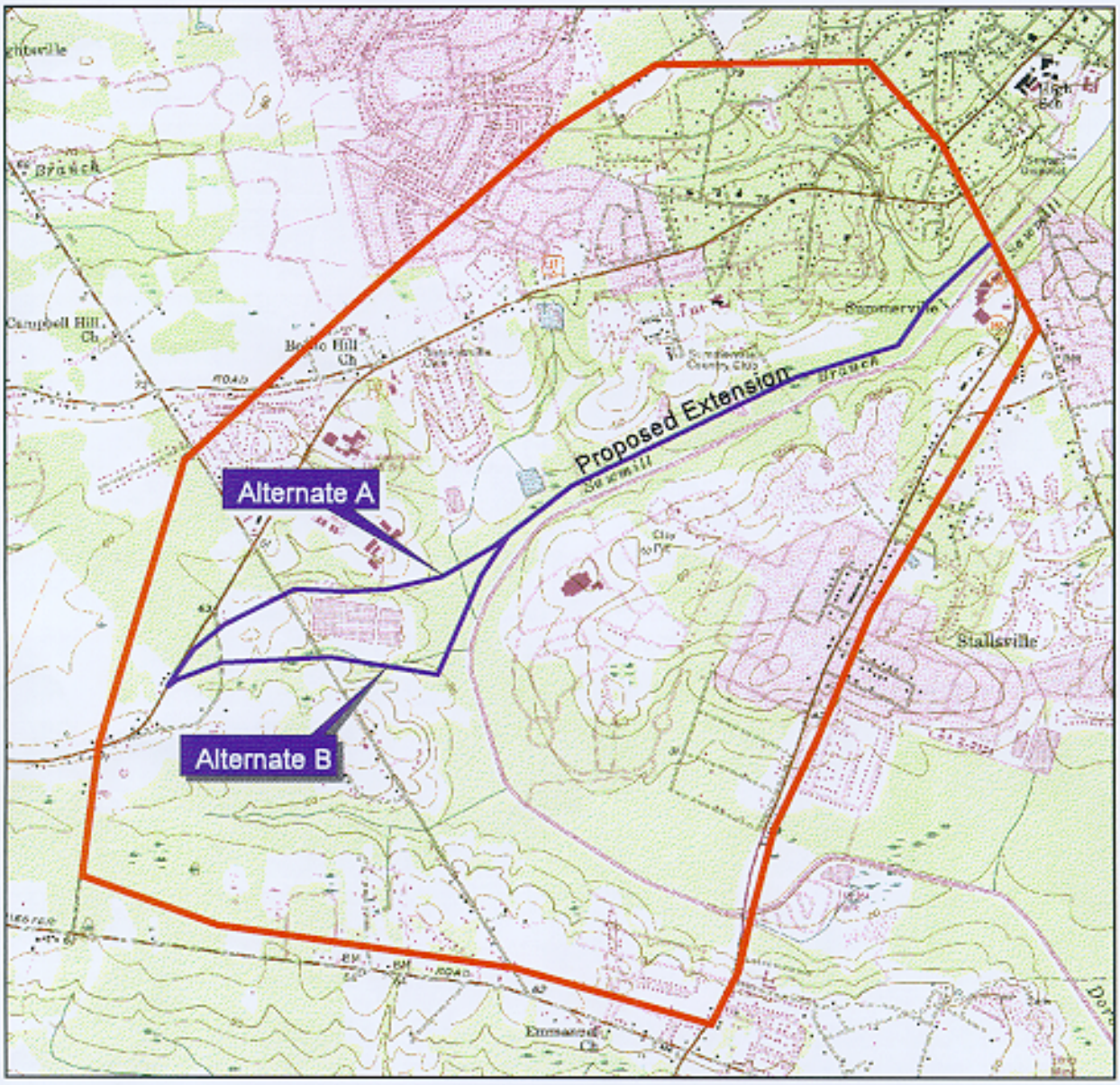

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Figure 3.

preservation and an aid to future development in Dorchester and other coastal counties of South Carolina.

Wetland Mitigation Banking

During the development of land for purposes of residential, commercial or industrial use, wetlands, which are protected under section 404 of the Clean Water Act, are often unavoidably impacted. Wetlands are defined by the USACE and US Environmental Protection Agency (USEPA) under section 404 of the Clean Water Act as:

"Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

To make a field determination of the presence of a wetland, three criteria must be met. These are the presence of wetland hydrology, hydric soils, and predominance of hydrophytic vegetation. In normal circumstances, all three criteria are met, however when one or more of the conditions are removed, the area may no longer be defined as a wetland, by the USACE definition. When existing wetland areas are found to meet all three criteria, they need to be delineated and verified by the USACE in order to determine the boundaries and acreages of the wetlands. See Appendix A for a detailed explanation of the three criteria used in wetland area determinations. In most of these cases the owner/developer must apply to the USACE for a permit to impact these wetlands. Projects located in the eight coastal counties of South Carolina must also be approved by SCDHEC's Office of Coastal Resources Management (OCRM). Included in many permits are plans for the mitigation or compensation for the loss of the impacted wetlands.

Mitigation plans usually call for the enhancement, restoration, and creation, or to a lesser extent, preservation of other nearby wetlands. This is required to replace the functional values of the impacted wetlands and to support a *"no net loss"* of wetlands within the same watershed. The preference of the permitting agency is generally that the mitigation of wetlands occurs on

the same site or property as the impact(s), thereby retaining the total functionality of that wetland area. In many cases where mitigation is required, an on-site option for this mitigation is not feasible or practicable due to property size or other site characteristics. In this instance, the mitigation portion of the project must be conducted off-site.

One type of acceptable off-site mitigation is the purchase of mitigation bank credits. A mitigation bank is a site where wetlands are restored, enhanced, created, and/or preserved expressly for the purpose of providing compensatory mitigation. The mitigation credits in a bank are established *before* impacts take place. The mitigation bank can be a public use bank, which compensates for impacts resulting from road building/improvement and other public works related projects. The other common bank is privately operated as a for-profit business, which sells wetland mitigation credits to both the public sector and private individuals or businesses.

In both cases wetland mitigation banks consist of already functioning wetlands that have been restored, enhanced, preserved and/or created. The determination of the number of wetland credits for sale in a bank is derived from some combination of those four activities. Mitigation credits are calculated by M*A where A is the total area of a given category of mitigation (e.g. creation, enhancement) and M is the mitigation multiplier. M is dependent on several factors including the method used to establish the bank (e.g. preservation, restoration). For restored and enhanced wetlands the mitigation multiplier is dependent on:

A) Net improvements

B) Soils (origin/source)

C) Hydrology (mechanical, created, natural)

D) Vegetation (natural or planted)

E) Maintenance required

F) Monitoring and contingencies plan

G) Credits schedule

H) Kind

I) Location

The amount of credit that may be generated in one acre of wetland varies, but a maximum of five credits per acre may be gained if conditions are optimal. The current market value of one mitigation credit is approximately $1,800 (Vandross Bay Mitigation Bank, Georgetown Co.). For a restoration and enhancement wetland mitigation bank the amount of credits is generally higher, because of the higher success rate of these types of mitigation over wetland creation, but also because in preserving existing wetlands, no net gain of wetlands is made. They also are protected by legal documentation (e.g. conservation easements and Declaration of Restrictive Covenance) from future impacts. In the case of the Sawmill Branch most of the credits produced would be from restoration and enhancement.

The method of marketing of credits is dependent on the Individual Mitigation Banking Agreement and Banking Instrument. The bank sponsor, in coordination with the Mitigation Bank Review Team (MBRT), drafts this instrument in order to outline how the bank will be established and operated. This instrument describes how the bank is to be established and how it is to be operated with respect to both monitoring and sale of credits. The banking instrument establishes before hand the specific criteria for the success of the bank. **(Appendix B)**

Since each mitigation bank is unique in its location, type of wetlands, and operations, some may be deemed as more important wetland areas than others. Areas of the state of South Carolina which are identified by South Carolina Department of Natural Resources (SCDNR),

United States Fish and Wildlife Service (USF&WS), National Marine Fisheries Service (NMFS), USEPA, SCDHEC, and USACE as specific target areas for the preservation, restoration and/or enhancement of natural resource values are known as Priority Management Areas (PMA). These areas may be associated with wildlife refuges, heritage trust sites, national estuarine sites, other similar habitat management programs and high risk wetland sites, where development of quickly growing urban areas threaten these wetlands. Also included in PMA criteria are designated wild and scenic river corridors; the Sawmill Branch Canal may qualify as this type of PMA, after review by the MBRT. The marketing advantage of PMA's is that the credits generated in these wetlands may be sold over a wider service area. **(Appendix B)**

Mitigation banks operating or currently proposed in the state include several which are operated by the SCDOT to mitigate for SCDOT public works projects. The SCDOT banks are Black River Mitigation Bank in Clarendon Co., Sandy Island Mitigation Bank in Georgetown and Horry Cos., Huspa Creek Mitigation Bank in Beaufort Co., and Edisto Island Mitigation Bank, in Charleston Co. Other mitigation banks which are operated or proposed for profit in South Carolina are Vandross Bay mitigation bank in Georgetown Co., Friend's Neck Mitigation Bank in Kershaw Co., Brown Bay Mitigation Bank in Horry Co., Swallow Savannah Mitigation Bank in Allendale Co. and Black River Bottomland Hardwood Mitigation Bank in Williamsburg Co.

The only currently proposed mitigation bank in Dorchester Co. is the Beidler Forest Fee Mitigation Bank in the Francis Beidler forest. It is proposed as a preservation mitigation bank. This type of bank does not include the restoration or enhancement of wetland areas to increase their function. It simply provides protection in perpetuity of the wetlands in the bank. The rapid growth of urban developed areas in Summerville will create a unique setting for the development

of a wetland preserve consisting of cypress/hardwood bottomland swamp. This was one of the most common wetland types historically in the southeastern United States, and now is one of the most endangered by human expansion.

Study of Sawmill Branch Canal

Methods

Photo-interpretation of wetlands- The wetland photo-interpretation portion of the study was conducted using one meter resolution 1994 National Aerial Photography Program (NAPP) digital quarter quadrangles as a base map. The NAPP data were obtained from the SCDNR Land Resources Division in Columbia, SC. The NAPP infrared aerial photos were taken in transects of the entire state in February 1994. Historical occurrence of wetlands in the Sawmill Branch Canal basin was also interpreted using National Wetlands Inventory (NWI) maps. The extent of hydric soils associated with the Sawmill Branch Canal was also determined for the study area using the Dorchester County Soil Survey (Natural Resources Conservation Service (NRCS) publication). The information from these resources was integrated to show an approximation of the current area of wetlands adjacent to the Sawmill Branch Canal. This photo-interpretation was not meant to determine the conditions of these wetlands. This method of photo-interpretation also gives only an approximation of wetland areas, and is not an acceptable substitute for an on-site inspection and delineation of wetland areas using USACE methodology. The three criteria for making an on-site determination may be found in **Appendix A.**

Conditions and inverts of wetlands- To determine the current conditions of the wetlands in the study area, a biologist from Sabine & Waters established within the wetland areas sample points where vegetation, soil and hydrological data were recorded. Also observed were the points of drainage into the canal for the purpose of locating areas which may be improved to help establish a mitigation bank. Direction of water flow within and between the wetlands will be

best determined after a thorough topographical survey is conducted. A topographical survey will also be necessary to accurately estimate storm water capacity and also to aid in the engineering portion of planning the wetland mitigation bank.

Property ownership bordering the area- Ownership of property bordering the canal and wetlands area was completed using the Dorchester County Realty Directory 13th edition (TRW REDI, 1996) and from Dorchester County tax assessor data. Parcels that were overlapped by areas interpreted as wetlands during the photo-interpretation portion of the study were listed and the status of the land as either developed or undeveloped was recorded. Parcels are referenced using the TMS number.

Inventory of Impervious surfaces- Inventory of impervious surfaces was completed using ArcView Image Analyst software (ESRI, Inc. registered trademark). The data source was a 1994 NAPP-National Aerial Photography Program photo that was scanned into the computer at one-meter resolution. The digital image was rectified and masked to the Sawmill Branch study area. An unsupervised classification into sixteen categories was performed on the image. The sixteen categories were grouped into one of two classes: pervious or impervious. The classified image was converted to an Arcview shapefile in order to calculate area and acreage.

Inventory major ditches and drainage pipes using GPS- The ditch and drainage inventory was conducted by Sabine & Waters personnel in the field using a Global Positioning System (Trimble Pro-XR). The inventory of the drainage focused on the position of culverts which drain the wetlands adjacent to the Sawmill Branch Canal. These culverts are the same

ones that were installed in the berms along either side of the canal to allow drainage of water during storms. The major ditches inventoried included those that have been regularly maintained for the purpose of draining water directly into the canal. The data collected was incorporated into a map to graphically display the position of these ditches.

Results

Photo-interpretation of wetlands- The first phase of this study was a photo-interpretation of the current wetland areas adjacent to Sawmill Branch Canal. The total existing and/or restorable wetland acreage that is adjacent to or connected with the Sawmill Branch, within the study area, is approximately 638.6 acres. **Figure 4** shows the wetland areas interpreted from this photo that were undeveloped at the time the photo was taken (NAPP February 1994). **Figure 5** is taken from an NWI-National Wetlands Inventory map (US Dept. of Interior, US F&WS), and shows historical wetlands in the study area, for an explanation of wetland type see **Table 1.** The approximate wetland acreage contained in the entire study area is 688 acres, based on the NWI map figures.

As seen in the Special modifier column of the table, when the wetlands in this area were inventoried (based on a NAPP aerial photo dated March 1984), many of the wetland areas were partially drained, or otherwise affected by human activities. The areas listed on the NWI map as wetlands do contain hydric soils that are mapped in this area. Shown in **Figure 6,** is the study area as it is mapped by soil type (NRCS, 1985). **Table 2** is a key of the soil types occuring in the study area, and indicates which soils are listed as hydric, non-hydric, and their drainage class.

The current area of wetlands that fit all three criteria within the study area would need to be determined by a wetland area delineation, verification by USACE and survey. These wetland areas would be candidates for either enhancement, or preservation, depending on their current conditions.

Conditions and inverts of wetlands- To determine the condition of the wetland and former wetland areas adjacent to the Canal, 27 sample points were visited. Using methods

Sawmill Branch
Photo-interpreted Wetland Boundary

Legend

1994 NAPP Image of Study Area

Photo-interpreted Wetland Boundary

0 0.2 0.4 0.6 0.8 1 Miles

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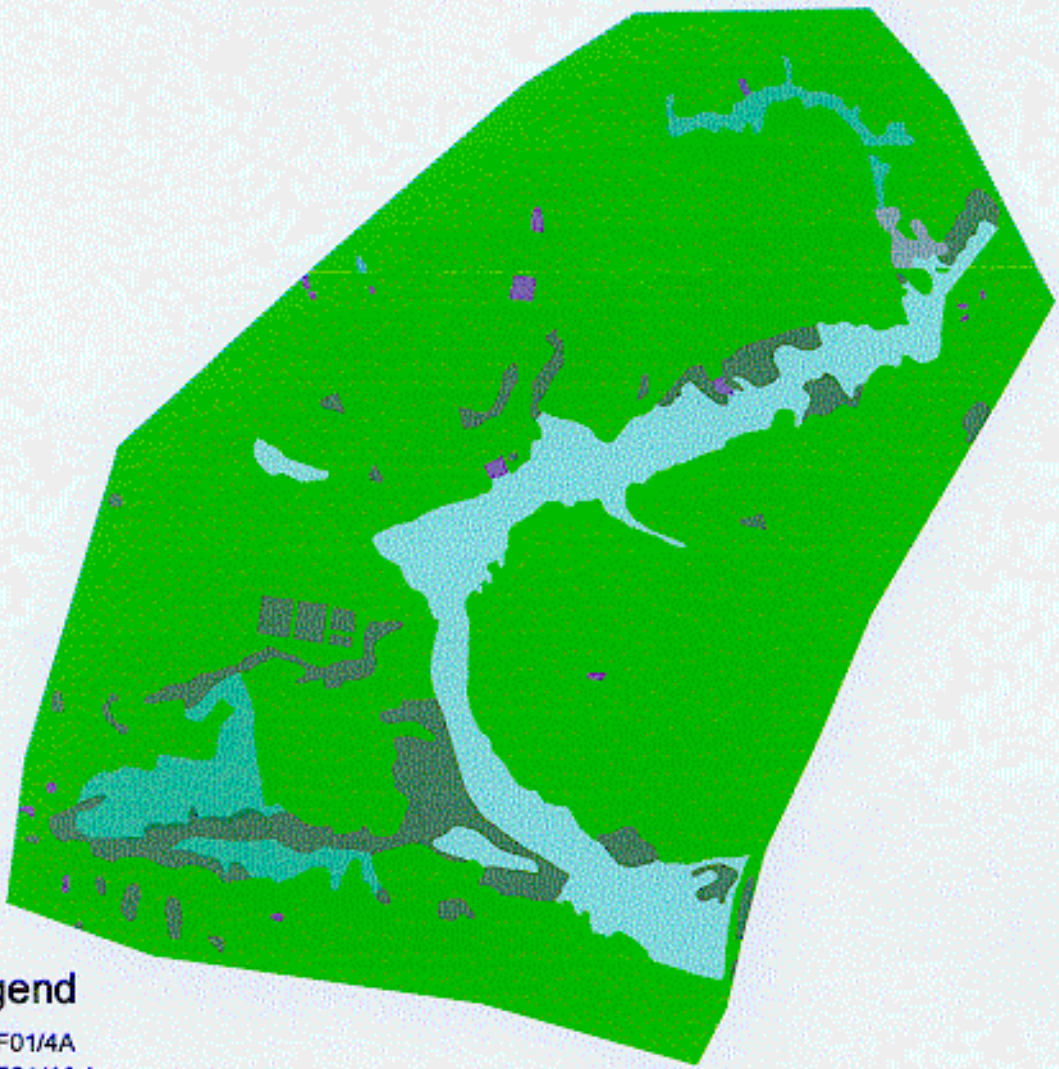
Figure 4.

Sawmill Branch
National Wetlands Inventory



Legend

- PF01/4A
- PF01/4Ad
- PF01Cd
- PF06F
- PUBHh
- PUBHx
- PF04Ad
- Other Wetlands
- Uplands

N

0 0.2 0.4 0.6 0.8 1 Miles

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Figure 5.

Table 1: National Wetlands Inventory – List and Characteristics of Mapped Wetlands in the Sawmill Branch Canal Study Area

NWI Code	Wetland type (system)	bottom type (class)	Vegetation (sub-class)	water regime (non-tidal)	Special modifiers
PFO1Cd *	Palustrine	forested	Broad leaved deciduous	Seasonally flooded	Partially drained/ditched
PFO4Ad *	Palustrine	forested	Needle leaved evergreen	Temporarily flooded	Partially drained/ditched
PFO1/4A	Palustrine	forested	Broadleaf dec.& needle leaved evergreen	Temporarily flooded	
PFO7Bd	Palustrine	forested	Evergreen	Saturated	Partially drained/ditched
PFO6Cd	Palustrine	forested	Deciduous	Seasonally flooded	Partially drained/ditched
PFO6F	Palustrine	forested	Deciduous	Semipermanent flooding	Partially drained/ditched
PFO1/4Ad	Palustrine	forested	Broad leaf deciduous	Temporarily flooded	
PUBHh	Palustrine	Unconsolidated bottom		Permanently flooded	Diked/impound
PUBHx	Palustrine	Unconsolidated bottom		Permanently flooded	Excavated

* asterisk indicates wetland types adjacent to the sawmill branch canal

Sawmill Branch Soils

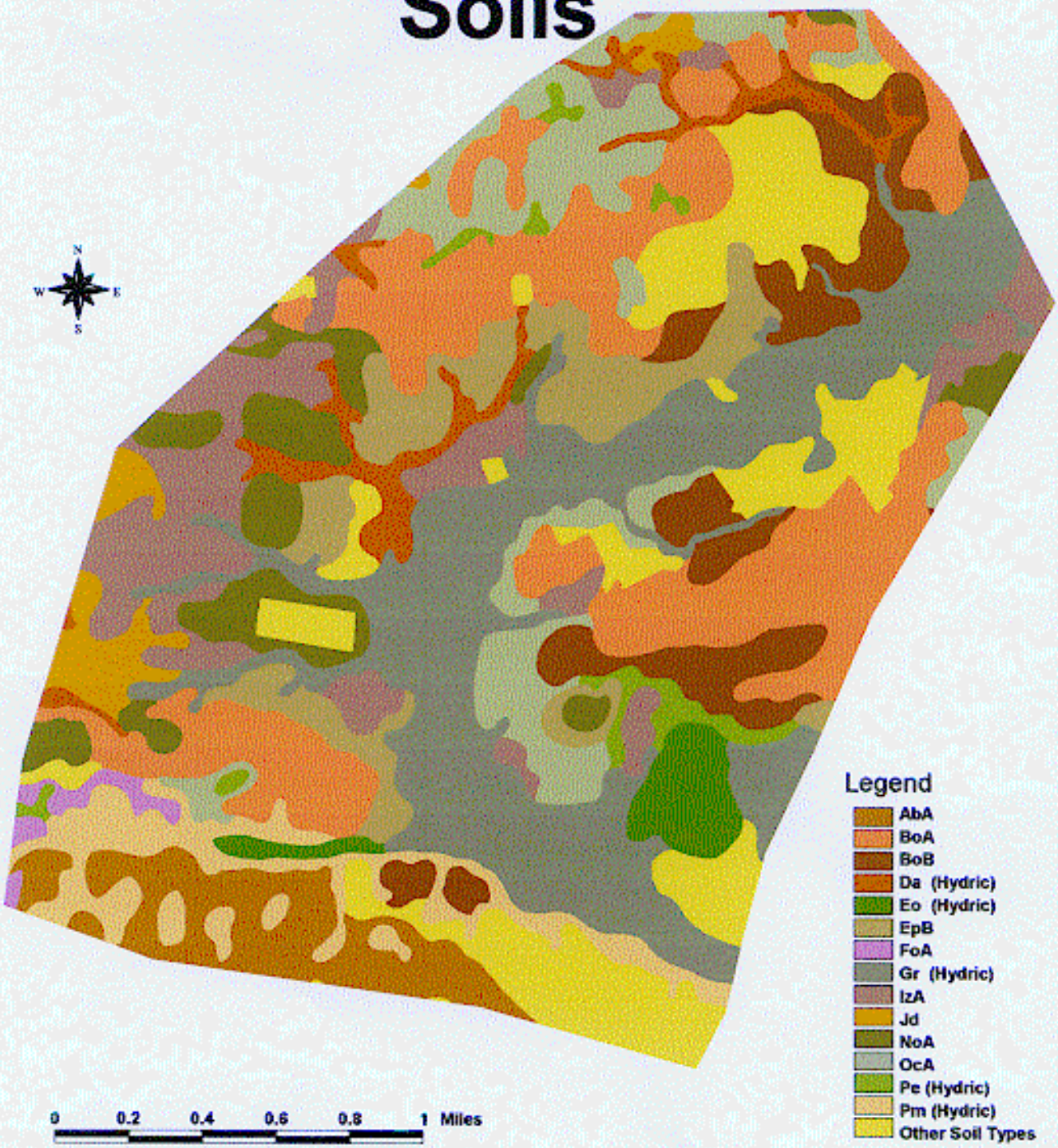

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Figure 6.

Table 2: Soil Types Located in Sawmill Branch Canal Study Area

Soil map code	Soil name and texture	Drainage class	National Hydric soil listing
Gr **	Grifton fine sandy loam	PD	YES
OcA *	Ocilla sand	SPD	NO
Pm *	Plummer loamy sand	VPD	YES
IzA *	Izagora silt loam	MWD	NO
Hp *	Haplaquents (mined)	VARIABLE	NO
NoA *	Noboco loamy sand	WD	NO
Eo *	Elloree loamy fine sand	PD	YES
EpB *	Emporia loamy fine sand	WD	NO
Da *	Daleville silt loam	PD	YES
Pe	Pelham sand	PD	YES
Jd	Jedburg loam	SPD	NO
BoB	Bonneau fine sand 2-6%	WD	NO
FoA	Foreston loamy fine sand	MWD	NO
AbA	Albany fine sand	SPD	NO
BoA	Bonneau fine sand 0-2%	WD	NO

* indicates soil that occurs in close proximity to Sawmill Branch Canal

** indicates soil that is the dominant type in Sawmill Branch Canal wetlands

described in the 1987 Manual for the Determination and Delineation of wetland areas (USACE), it was found that only two of the 27 points had no wetland features, and these two points had been significantly altered. Four of the 27 points contained wetlands that had all three criteria necessary to make a wetland determination. Of the remaining 21 points, all had a past wetland signature (vegetation and soils) but were missing the hydrology typical of cypress/hardwood bottomland forest mapped in this area. In these areas it was clear that the area was once wetland, but had been excessively drained. In all cases where the wetlands are lacking hydrology, there is typically a large culvert pipe nearby draining the wetland directly into the canal. The pipes generally are installed at the ground level inside the wetland and go under the berms beside the canal and discharge into the Sawmill Branch.

The typical soil profile in the functional wetland areas adjacent to the canal was that of a Grifton fine sandy loam which is the mapped soil type for this area. The soil was much less saturated or moist, in most areas checked, than would be expected in a natural state. The typically dominant vegetation in the functional wetland areas included *Taxodium distichum, Nyssa quatica, Acer rubrum, Saururus cernuus, Hydrocotyle* spp. and other obligate wetland plants. In the degraded wetland areas that lack hydrological indicators, the soil still matches closely with a Grifton profile, with a slight brightening of 1 chroma unit, and the soil is no longer saturated. The vegetation in the degraded areas is still similar in the tree stratum, however the shrub, vine and herb strata are now dominated by some early successional species which are more tolerant of dry conditions, such as *Myrica cerifera, Pinus taeda, Lonicera japonica,* and *Ligustrum sinense.* The lack of natural/historical wetland hydrology over the past few decades coupled with frequent disturbance by development and maintenance of the berms have allowed these plants to become established in former wetlands.

The inverts of the wetlands, showing where the water will flow out instead of in will be shown as the result of a subsequent topographical survey, which will need to be conducted before any mitigation project begins. The topographical survey will be necessary to determine the elevation of all nearby housing areas before any mitigation can begin. The proximity of housing developments along the canal, in some cases may prevent restoration of the proper hydrology to restore wetlands to their natural state.

Ownership of property bordering the Sawmill Branch and associated wetlands-Land parcels that are overlain by the photo-interpreted wetlands of the Sawmill Branch Canal are shown in **Figure 7**. Listed in **Table 3** are the un-subdivided individual parcels located adjacent to the Sawmill Branch Canal or its associated wetlands. Of the 49 properties listed as being associated with the Sawmill Branch Canal wetland areas, 10 are improved or developed in some way while 39 remain unimproved. The type and acreage of improvements or on the developed properties is not stated in the TRW-REDI 1996 publication. Included are acreage and status of the property with respect to development. This information may also be obtained by using the parcel information package provided in ARCINFO format.

Impervious surface Inventory- The area of impervious surfaces that drain in to the Sawmill Branch Canal is currently approximately 722 acres **(Figure 8)**. The result of a typical one inch rain event is the direct discharge of approximately 19.6 million gallons of water into the canal. For the entire study area including pervious and impervious surfaces, the quantity of water discharged is approximately 89.5 million gallons. The capacity of the functional and restorable wetlands present in the study area depends upon their total mean depth and the points

Sawmill Branch
Property Parcels

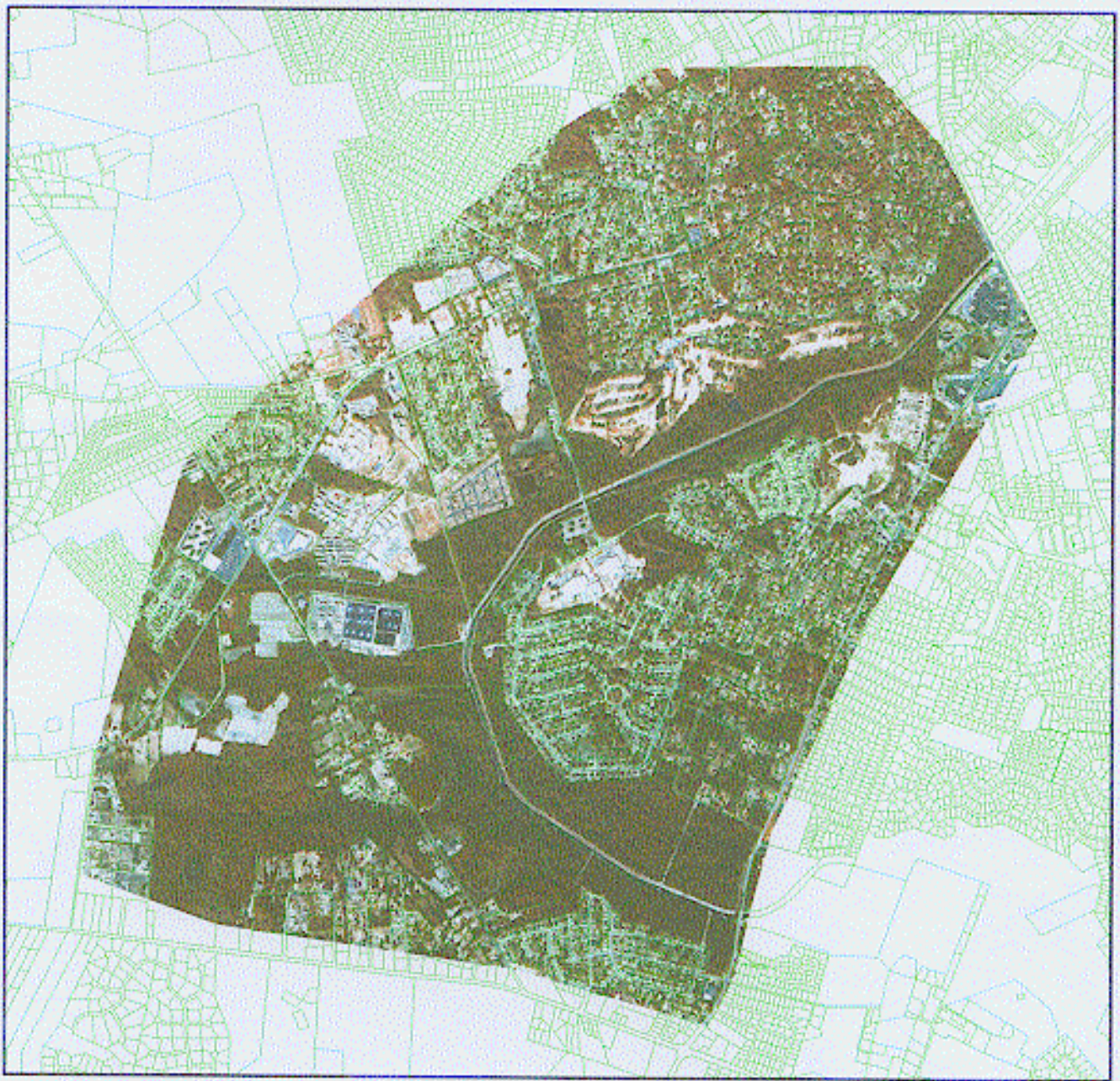

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Figure 7.

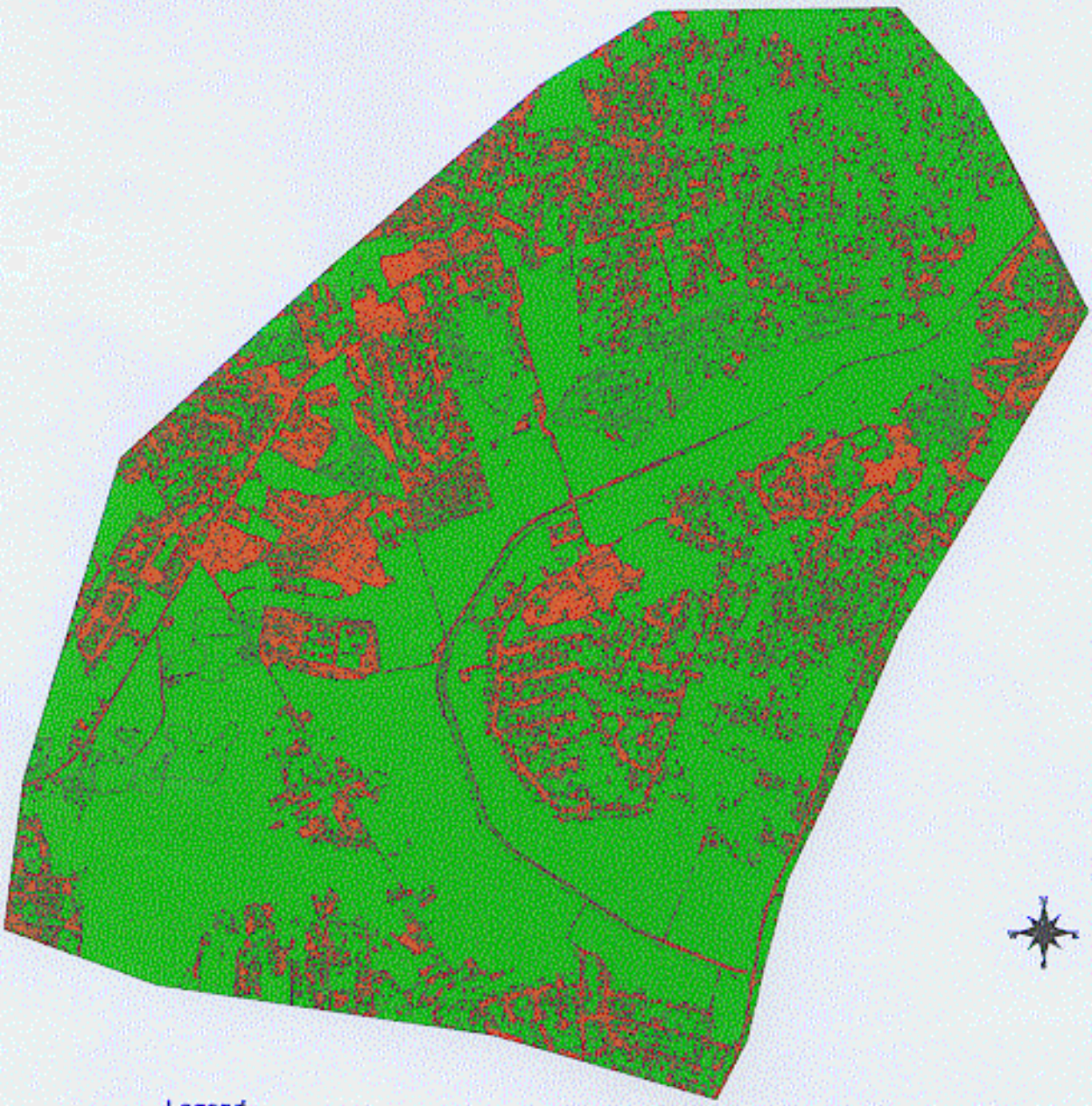
Table 3: Individual Land Parcels included in the Photo-interpreted wetlands of the Sawmill Branch Canal

Parcel TMS number	Acreage (total)	Status of development – 1996 *
144-00-00-46	19.39	Undeveloped
144-00-00-09	51.48	Undeveloped
144-00-00-80	8.33	Undeveloped
144-00-00-58	1.9	Developed
144-00-00-57	8.8	Undeveloped
144-00-00-15	3.9	Undeveloped
144-00-00-76	3.8	Undeveloped
144-00-00-08	36.86	Developed
144-00-00-17	15.89	Undeveloped
144-00-00-45	12.7	Undeveloped
144-00-00-29	104.53	Undeveloped
144-00-00-71	15.0	Undeveloped
144-00-00-66	5.0	Developed
145-00-00-04	12.16	Developed
145-00-00-15	9.5	Undeveloped
145-00-00-05	11.6	Developed
145-00-00-13	42.12	Undeveloped
145-00-00-06	52.36	Undeveloped
152-00-00-132	4.5	Undeveloped
152-00-00-133	2.0	Undeveloped
152-00-00-52	120.23	Undeveloped
152-00-00-37	5.25	Developed
152-00-00-38	10.5	Developed
152-00-00-39	14.55	Undeveloped
152-00-00-40	17.21	Developed
152-00-00-108	5.3	Developed
152-00-00-41	16.3	Undeveloped
152-00-00-49	10.53	Undeveloped
152-00-00-120	23.3	Undeveloped
152-00-00-35	23.3	Undeveloped
152-00-00-33	3.05	Undeveloped
152-00-00-55	146.84	Undeveloped
152-00-00-34	3.04	Undeveloped
152-00-00-89	2.4	Undeveloped
152-00-00-88	2.4	Undeveloped
152-00-00-87	2.4	Undeveloped
152-00-00-86	2.4	Undeveloped

152-00-00-85	2.4	Undeveloped
152-00-00-42	2.4	Undeveloped
152-00-00-80	2.4	Undeveloped
152-00-00-81	2.4	Undeveloped
152-00-00-82	2.4	Undeveloped
152-00-00-83	2.4	Undeveloped
152-00-00-84	2.4	Undeveloped
152-00-00-144	7.89	Undeveloped
152-00-00-43	7.9	Undeveloped
152-00-00-44	12.5	Undeveloped
152-00-00-142	7.9	Developed
152-00-00-45	7.4	Undeveloped
Developed/improved		**10**
Unimproved/Undeveloped		**39**
TOTAL		49

* **Status does not imply type or amount of developments or improvements.**

Sawmill Branch
Pervious/Impervious Surfaces



Legend

Pervious Surface

Impervious Surface

0 0.2 0.4 0.6 0.8 1 Miles

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Figure 8.

of discharge into the Sawmill Branch Canal. An estimate based on a two-foot average depth of wetlands is a capacity to store 416.2 million gallons of water in the wetlands. These figures would be the result if full restorations of wetlands in the canal basin were to take place and the two-foot depths were the mean. In the event of the extension of the Berlin G. Meyers parkway through the Canal area, these figures would change based on the width, length and route of the road corridor.

GPS Inventory of major ditches and culvert pipes- The ditch and culvert inventory resulted in the location of 47 discharge points of either ditches or culverts into the Sawmill Branch Canal. These points are where water is drained from the wetlands surrounding the canal and also serve to provide drainage to the developed areas surrounding the wetlands and the canal **(Figure 9).** The status of each culvert or ditch with respect to size, location relative to features on the ground and amount of water flowing out at the time of the visit can be seen in **Appendix C.**

Inventory of Ditches and Culverts Draining into Sawmill Branch Canal

Legend

1994 NAPP Image of Study Area

Photo-interpreted Wetland Boundary

Ditch/Culvert

0 0.1 0.2 0.3 0.4 0.5 Miles

SABINE AND WATERS, INC.
ENVIRONMENTAL AND LAND MANAGEMENT CONSULTANTS

Date of Map Creation: 3/18/1999
Data Source: 1994 NAPP

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Figure 9.

Steps to Establishing the Sawmill Branch Mitigation Bank

Participation - The first step to establishing this mitigation bank will be to invite participants and identify one or more sponsors who will be responsible for the overall construction and operation of the mitigation bank. Since the bank location has already been defined as being in the Town of Summerville portion of the Sawmill Branch, the Town of Summerville is one obvious candidate for bank sponsor. The Sawmill Branch Mitigation bank will have many positive impacts on the daily life on the community of Summerville and its downstream neighbors Charleston and North Charleston. At the very least, the Town of Summerville will want to have a hand in the decision making concerning how this bank will be established and operated.

The formation of this mitigation bank will also benefit Dorchester County because it will make available wetland mitigation credits in close proximity to areas that may soon become ripe for development. When wetland mitigation bank credits are available, many future development projects in the county should go more smoothly, as this allows for more mitigation alternatives in planning these developments. Since the county has a vested interest in its own capacity for future development, Dorchester County as another public entity should take a leading role in the development of this bank.

The near term future of the Sawmill Branch may include an extension of the Berlin G. Meyers Parkway through much of its former wetland areas (**Figure 2**). Because this extension is likely to impact a significant amount of wetlands, the banking of wetland mitigation credits ahead of time would be in the best interest of the South Carolina Department of Transportation.

Since the SCDOT currently operates several mitigation banks in other regions of the state for mitigating road construction related projects it could conceivably be needing most of the credits available after just a few road construction and improvement projects in the Summerville and Dorchester County area.

Coordination with agencies - After a bank sponsor has been identified, the Mitigation Bank Review Team must be contacted either through the USACE or USDA-NRCS. The personnel in these agencies are required to participate in the planning of the mitigation bank (i.e. site selection, design, success criteria designation, monitoring and remediation plan development etc.) This plan will become incorporated into an individual mitigation banking instrument (**Appendix B**). It will identify parties responsible for the acquisition, development, managing and monitoring of the site and bank credits. Following this the MBRT will review the banking instrument and if an approval consensus is reached, the interagency personnel on the MBRT will sign the Individual Mitigation Banking Agreement. This is the final approval for the establishment of the bank.

Areas to be phased in to the bank - After these administrative matters are taken care of, the technical aspects of establishing this bank must begin. The acquisition by purchase or easement of land parcels is a necessary before any work can begin. Before different land parcels are phased into the bank, a topographical survey of these areas should be conducted to determine the best course of action regarding re-routing of water back into the system. It has been over 20 years since the Sawmill Branch wetlands have been retaining water and as a result residential development may affect the usable area in the bank. Inversely, surrounding private landowners need to be assured that the flooding of the wetlands in the bank will not cause flooding on their property.

In all cases along the Sawmill Branch Canal, the loss of wetland function has come as the result of a reduction in the frequency, duration and depth of flooding. Therefore, the most important technical factor in restoring these wetlands is the removal or plugging of the culverts and ditches the drain or divert water from them into the canal. New culverts will need to be installed in order to prevent flooding back into the neighborhoods. The engineering plan that must be completed before this phase will give a clear picture as to the amount of work to be done.

The best areas to be phased into the bank at this time are the wetland areas located in the southern portion of the study area between the Woodland Estates subdivision, and the Crestwood Subdivision. These parcels contain the largest undeveloped areas in the Sawmill Branch. The mitigation should continue at least as far north as the Summerville-CPW wastewater treatment plant. These areas contain some functional wetlands already and would leave a larger unbroken area to for the restoration and enhancement of wetlands without a great deal of effort spent avoiding the risk of flooding residential areas. Also in the larger areas with more currently functional wetlands, it may be easier to purchase land and get conservation easements in exchange for tax benefits. In some of the more narrow sections of wetland on the northern end of the Canal study area, the development is closer to the Canal, so that these areas will be more difficult to phase in for less gain in wetland area. Also, with a possibility that the BGM parkway may be extended through the canal area south of Tea Farm and Country Club Estates subdivisions, the restoration of wetlands there may not prove to be worthwhile. If the plans for the future of the Berlin G. Meyers Parkway change then these areas would be good areas to restore wetland function, in particular to aid in the filtration of runoff from Summerville Country Club.

Benefits and Costs of the Sawmill Branch Mitigation Bank

Benefits – The benefits of creating a restoration and enhancement wetland mitigation bank at the Sawmill Branch are many. First among these is the preservation of open space in a community which prides itself on natural beauty. Growth of business activity, population and housing needs are expected to continue in the coastal South Carolina region for decades to come, and this is a great opportunity to preserve some of that natural beauty in perpetuity for future generations. This preservation of undeveloped land will help to increase the value of property already developed in the area because it provides scenery, recreational and educational opportunities, and contributes to quality of life for those living near it.

The Town of Summerville is currently constructing a walking/biking trail adjacent to the Sawmill Branch on the berm. This mitigation bank will lend scenery to this trail, and present educational and recreational opportunities for the area's residents, particularly the nearly 5900 public school students enrolled in four public schools adjacent to the canal. The development of an associated interpretive trail could allow for short (< ½ day) field trips by school classes for environmental studies without the need of a bus. Also, by allowing research, education and public access activities in the mitigation bank, more credits are made available due to provisions of the South Carolina MBRT.

The impact on wildlife and fisheries of this mitigation bank could potentially be enormous. Currently Dorchester County must regularly dredge the canal in order to avoid excessive silt build up (USACE recommends that dredging be conducted every 2-3 years). The silt washing into this canal and the resulting dredge effort prevents a significant amount of

colonization in the streambed by longer lived plants, invertebrates and fish, and the associated wildlife. The restoration of these wetlands would provide a fish and wildlife refuge and a contiguous corridor for wildlife, which depend on forested wetlands for food and shelter. If the surrounding wetlands were restored, the quality of the water entering the canal would be much higher, with lower silt loads, higher dissolved oxygen, and fewer pollutants from impervious surface runoff. The result of a large-scale restoration effort would eventually be the re-establishment some game fish in the creek. Even a small restoration would improve downstream water quality and increase the fitness of larval fish in the upper reaches of the Ashley River. Overall, any alteration to increase the residence time of stormwater in the wetlands will cause the costs of canal maintenance to drop, and water quality increase. Maintenance activities of restored and enhanced wetlands are typically minor, and such a large area will not have a significant build up of sediment. As a result, dredging should be unnecessary.

The most direct benefit of the Sawmill Branch Mitigation Bank will be the generation of funds by sale of mitigation credits to developers. This creates three important side benefits. First, the money for the initial investment and maintenance of the bank is recouped. Second, the availability of added mitigation alternatives would attract more business to the area. Third, the mitigation bank will be providing the general public and government agencies with a mitigation bank that is adding to the nation's wetland resources.

Costs – The largest costs of the Sawmill Branch Canal Mitigation Bank will be incurred during the establishment phase. Initially, engineering and environmental consultants will be needed to aid in a thorough examination of the areas to be restored and enhanced. Coordination of planning and establishing the bank with the USACE and other agencies may need to be

facilitated by professional wetland consultants. Once the wetlands to be restored are chosen, the acquisition of land from private landowners will constitute the largest up front money cost, unless the cheaper alternative of getting conservation easements can be used. Costs of purchasing land can be reduced if landowners can be convinced to agree to a conservation easement on the parts of their property to be used in the bank in exchange for tax benefits.

The construction of the structures to control water level and removal of old culverts will be another major cost. The amount is dependent on the size of area to be restored. This will be a one time cost for each wetland that is restored. Finally, the monitoring, maintenance and operation of the bank will be a continuous cost which eventually will be offset by both monetary income derived from sale of credits, but also will be offset by the non-monetary benefits to the community at large. If the wetlands become degraded during operation of the bank, credits may not be approved for sale; in this case remedial activities would be necessary.

As seen by the current conditions of the Sawmill Branch Canal wetlands, the needed component in the restoration of functional wetlands throughout much of their former extent requires only the re-introduction of proper hydrology. The diversion of ditches and the raising of culvert pipes in the areas to be restored could accomplish this fairly easily. Since most of the original vegetation and soils from the wetlands are still present in the system, the Sawmill Branch Canal wetlands could be restored and enhanced relatively quickly since replanting and soil replacement would be minimal. Previously, an experiment similar to this proposal was conducted adjacent to the Sawmill Branch Canal and the existing Berlin G. Myers Parkway near Gahagan Rd in Summerville. The result was the restoration of wetland functions in a once degraded area, which had essentially the same characteristics as the restorable wetlands in this study.

The monetary cost of creating a restoration and enhancement mitigation bank in the former wetlands of the Sawmill Branch Canal would be dependent on many factors. The size of the area to be restored is the primary factor in determining cost. Also included would be the restoration of the hydrology using construction equipment and materials. If the area restored needs to be planted with wetland species to be in compliance with the MBRT plan for mitigation, this would add another cost. Each mitigation bank is different in its restoration potential and the amount of work needed, so costs can vary widely. The preference of the MBRT is for mitigation banks to be of larger size (100's to 1000's of acres), consequently the initial phasing in of restored and enhanced wetland areas into the bank should include large parcels. The MBRT will help determine the amount of credits to be made available by the restoration and enhancement activities. The overall benefits of the restoration to the wildlife and fisheries, and the simplicity of the restoration, will make the Sawmill Branch Canal worth the cost to the bank sponsors.

Recommendation

The establishment of a wetland mitigation in the Sawmill Branch Canal is an effort that should be undertaken by a public service entity in order to provide natural resource benefits to coastal South Carolina. It will aid developers by providing alternative wetland mitigation in the Coastal zone, and Dorchester County in particular. Finally, the bank will provide a permanently preserved recreational, public access corridor to the residents and visitors to the Summerville community. The many benefits of establishing this bank outweigh the costs. Also if this proposal is pursued, the wetland areas adjacent to Dorchester Creek should also be studied for the feasibility of conducting wetland mitigation there as conditions are likely to be similar to this study area. A unique opportunity exists here for a wise investment in natural resource preservation. The Town of Summerville, Dorchester County and SCDOT should take this opportunity into consideration for the good of this community and many future projects in it.

Proposal for the Development of an Environmental and Wetland Interpretive Trail in Conjunction with the Construction of the Sawmill Branch Canal Bicycle/Pedestrian Trail

The Sawmill Branch Canal bicycle/pedestrian trail is a public project that is currently under construction in the town of Summerville, South Carolina. The installation of a low cost environmental and wetland interpretive trail associated with the pedestrian trail would have many benefits on the local community in the area serviced by the trail, as well as the larger area of Dorchester County and other coastal counties in South Carolina. One benefit to the Town of Summerville would be to raise the awareness of citizens on the importance of incorporating wetlands into human dominated ecosystems. Other benefits include potential educational values of an outdoor environmental interpretive site, the recreational values of the trail and the increased sense of community pride in the nearby neighborhoods and the resulting increase in property value. The interpretive trail would benefit a much larger area including most coastal South Carolina counties by increasing the public support for establishing a wetland mitigation bank at the Sawmill Branch Canal which could service those counties.

Environmental interpretive trails are used by a variety of public and private entities in order to raise awareness of local environmental issues, create educational and recreational opportunities for the public and to promote positive public relations between the surrounding communities and the property these trails are located on. The costs of interpretive trails vary with location, size, available facilities, personnel involved (if applicable). Many interpretive trails associated with the National Wildlife Refuges system are highly maintained, contain numerous facilities and serve millions of people per year. On the other end of the spectrum,

locally owned and operated trails, either public or private may contain only signs and leaflets which are used as the interpretive guide to the trail. These local wetland and nature sites usually serve the community in which they are located. The Sawmill Branch Interpretive Trail would fit the latter category, and should include signage, kiosks and leaflets at the major facilities.

Establishing an environmental and wetland interpretive trail along the Sawmill Branch Canal pedestrian trail would involve placement of signs and two or three small kiosks at key points in order to make available literature pertaining to the trail. The cost of establishing the trail should be minimal since the location has already been acquired, and construction of the path has gotten under way. The development and installation of the kiosks and signage, and maintenance of any facilities will be the only costs associated with the trail. Many of these costs can be minimized by the use of volunteer groups. For the maintenance of specific facilities, local businesses may want to volunteer for the public relations value (e.g. adopt a trail litter control or this kiosk is maintained by So and So Inc.).

Kiosk design and placement- The kiosk should be a large rain resistant booth or covered sign which contains a map of the trail and its key points, show areas that are restricted or protected and explain to users the rules of the trail. Included at each kiosk should be an box containing leaflets which show the trail locations, explain key points of interest - which on the trail will be marked by numbered signs. Another box should contain comment cards which can be filled out by visitors to the trail in order to help improve service and add new point of interest Finally, at each kiosk a locked box should be located with a slot for a place that users can drop leaflets off and to collect comments. A trail log may also be kept to help track usage.

Three kiosks in the study area should be located at the logical trail entry points of Bacons Bridge road (north and south ends) and at Luden Rd. Which already has a parking area for

walkers and bicyclists. Once the popularity and usage of the trail increases, a fourth kiosk could be added for an access point at the Summerville High School. This placement of kiosks would cover the trail fairly evenly throughout the study area.

Development and placement of signage- It will be necessary to identify to the visitors the key points of interest on the trail. Two types of signs could be used for this, first the use of small simple numbered signs will cut the cost of installing and maintaining signage on the trail. A numbered sign would correspond to a number on the trail leaflets, which will explain the point's interesting characteristics and in depth information about that feature. The other type of signage that can be developed for the trail would be a larger sign with all of the information of each point of interest shown on the sign along with illustrations. This would eliminate the need for leaflets at the kiosks, however these signs would be more difficult and costly to construct and maintain. In either case the signs should be designed and placed by the same personnel in order to achieve consistency in lettering.

The types of key points to consider putting signs on in this trail will be areas where the wetlands are fairly functional and easy to see. The information included about the wetlands would include their physical and biological characteristics, the many benefits of wetlands to humans, the importance of protecting wetlands and an explanation of what a mitigation bank is and how it would benefit the local community. An emphasis on the benefits of the Sawmill Branch Mitigation Bank to surrounding property owners should be included in this. The list benefits specifically should include storm water retention, water quality improvement, open space preservation and wildlife and fishery benefits. Some narrative should also cover the roles played by government and regulatory agencies in the protection of wetlands.

After a biological survey is conducted, the signage could also cover points where specific plants and animals may be found. A good example of this is a sign helping users to identify and be cautious of poison ivy (*Toxicodendron radicans)* which is likely to be in abundant supply in the area. Keystone species of animals, such as great egrets, herons and other birds often seen in the Canal area could be included in the signage. An explanation of the ecology of wetland dependent wildlife is recommended when a sign is referring to a specific animal or plant. Included in the biological points of interest on the trail could be a bird identification guide or a list of what bird life birdwatchers could expect to see on the trail.

Local naturalists, environmental professionals and local users to achieve communication with the desired audience can provide a specific list of signs and narratives for the trail.

The location and design of the trail itself has already been determined as an asphalt bicycle/pedestrian path located on the outside of the canal relative to its bend in this area. Once the path is complete, the construction of signs/markers and kiosks on the trail should be very simple and inexpensive. The Town of Summerville should pursue this option of installing an Interpretive trail soon after in order to gauge the support for the mitigation bank. This trail could be extended in the future to include more areas in Summerville, which will help to connect neighborhoods and schools with other locations that may be frequently visited, such as the downtown area, the library and YMCA.

It is quite possible that this same action could be taken to extend the interpretive trail coverage as far down Dorchester Creek as the Old Fort Dorchester State Park. This would allow for a longer continuous corridor for bicyclists and pedestrians to utilize and enjoy the canal area. The use of the trail for a non-motorized corridor would be an attractive idea to children, retirees and exercise enthusiasts; also it provides an alternate mode of transportation which is in critically

short supply in the coastal SC area. Some funding may be possible from state sources, if Old Fort Dorchester Park is to become a terminus of the trail. When the interpretive trail is complete in the study area discussed previously, the possibility of extending the trail to Old Fort Dorchester State Park should be pursued.

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Part II.
Mandatory Technical Criteria for Wetland Identification

2.0. Wetlands possess three essential characteristics: (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology, which is the driving force creating all wetlands. These characteristics and their technical criteria for identification purposes are described in the following sections. The three technical criteria specified are mandatory and must all be met for an area to be identified as wetland. Therefore, areas that meet these criteria are wetlands.

Hydrophytic Vegetation

2.1. For purposes of this manual, hydrophytic vegetation is defined as macrophytic plant life growing in water, soil or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. Nearly 7,000 vascular plant species have been found growing in U.S. wetlands (Reed 1988). Out of these, only about 27 percent are "obligate wetland" species that nearly always occur in wetlands under natural conditions. This means that the majority of plant species growing in wetlands also grow in nonwetlands in varying degrees.

2.2. The FWS in cooperation with CE, EPA, and SCS has published the "National List of Plant Species That Occur in Wetlands" from a review of the scientific literature and review by wetland experts and botanists (Reed 1988). The list separates vascular plants into four basic groups, commonly called "wetland indicator status," based on a plant species' frequency of occurrence in wetlands: (1) *obligate wetland plants* (OBL) that occur almost always (estimated probability >99%) in wetlands under natural conditions; (2) *facultative wetland plants* (FACW) that usually occur in wetlands (estimated probability 67-99%), but occasionally are found in nonwetlands; (3) *facultative plants* (FAC) that are equally likely to occur in wetlands or nonwetlands (estimated probability 34-66%); and (4) *facultative upland plants* (FACU) that usually occur in nonwetlands (estimated probability 67-99%), but occasionally are found in wetlands (estimated probability 1-33%). If a species occurs almost always (estimated probability >99%) in nonwetlands under natural conditions, it is considered an *obligate upland plant* (UPL). These latter plants do not usually appear on the wetland plant list; they are listed only when found in wetlands with a higher probability in one region of the country. If a species is not on the list, it is presumed to be an obligate upland plant. The "National List of Plant Species That Occur in Wetlands" has been subdivided into regional and state lists. There is a formal procedure to petition the interagency plant review committee for making additions, deletions, and changes in indicator status. Since the lists are periodically updated, the U.S. Fish and Wildlife Service should be contacted to be sure that the most current version is being used for wetland determinations. The appropriate plant list for a specific geographic region should be used when making a wetland determination and evaluating whether the following hydrophytic vegetation criterion is satisfied.

Hydrophytic Vegetation Criterion

2.3. An area has hydrophytic vegetation when, under normal circumstances: (1) more than 50 percent of the composition of the dominant species from all strata are obligate wetland (OBL), facultative wetland (FACW), and/or facultative (FAC) species, or (2) a frequency analysis of all species within the community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, FACU = 4.0, and UPL = 5.0). *CAUTION*: When a plant community has less than or equal to 50 percent of the dominant species from all strata represented by OBL, FACW, and/or FAC species, or a frequency analysis of all species within the community yields a prevalence index value of greater than or equal to 3.0, *and* hydric soils and wetland hydrology are present, the area also has hydrophytic vegetation. (*Note*: These areas are considered problem area wetlands.)

2.4. For each stratum (e.g., tree, shrub, and herb) in the plant community, dominant species are the most abundant plant species (when ranked in descending order

of abundance and cumulatively totaled) that immediately exceed 50 percent of the total dominance measure (e.g., basal area or areal coverage) for the stratum, plus any additional species comprising 20 percent or more of the total dominance measure for the stratum. All dominants are treated equally in determining the presence of hydrophytic vegetation.

2.5. (*Note*: The "National List of Plant Species that Occur in Wetlands" uses a plus (+) sign or a minus (-) sign to specify a higher or lower portion of a particular wetland indicator frequency for the three facultative-type indicators; for purposes of identifying hydrophytic vegetation according to this manual, however, FACW+, FACW-, FAC+, and FAC- are included as FACW and FAC, respectively, in the hydrophytic vegetation criterion.)

Hydric Soils

2.6. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (U.S.D.A. Soil Conservation Service 1987). In general, hydric soils are flooded, ponded, or saturated for usually one week or more during the period when soil temperatures are above biologic zero 41° F as defined by "Soil Taxonomy" (U.S.D.A. Soil Survey Staff 1975). These soils usually support hydrophytic vegetation. The National Technical Committee for Hydric Soils has developed criteria for hydric soils and a list of the Nation's hydric soils (U.S.D.A. Soil Conservation Service 1987). (*Note*: Caution must be exercised in using the hydric soils list for determining the presence of hydric soil at specific sites; see p. 12.)

Hydric Soil Criterion

2.7. An area has hydric soils when the National Technical Committee for Hydric Soils (NTCHS) criteria for hydric soils are met.

NTCHS Criteria for Hydric Soils (U.S.D.A. Soil Conservation Service 1987):

"1. All Histosols except Folists; or

2. Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, or Pell great groups of Vertisols that are:

a. somewhat poorly drained and have water table less than 0.5 feet from the surface for a significant period (usually a week or more) during the growing season, or

b. poorly drained or very poorly drained and have either:

(1) water table at less than 1.0 feet from the surface for a significant period (usually a week or more) during the growing season if permeability is equal to or greater than 6.0 inches/hour in all layers within 20 inches, or

(2) water table at less than 1.5 feet from the surface for a significant period (usually a week or more) during the growing season if permeability is less than 6.0 inches/hour in any layer within 20 inches; or

3. Soils that are ponded for long duration or very long duration during the growing season; or

4. Soils that are frequently flooded for long duration or very long duration during the growing season."

(*Note*: Long duration is defined as inundation for a single event that ranges from seven days to one month; very long duration is defined as inundation for a single event that is greater than one month; frequently flooded is defined as flooding likely to occur often under usual weather conditions - more than 50 percent chance of flooding in any year or more than 50 times in 100 years. Other technical terms in the NTCHS criteria for hydric soils are generally defined in the glossary.)

Wetland Hydrology

2.8. Permanent or periodic inundation, or soil saturation to the surface, at least seasonally, are the driving forces behind wetland formation. The presence of water for a week or more during the growing season typically creates anaerobic conditions in the soil, which affect the types of plants that can grow and the types of soils that develop. Numerous factors influence the wetness of an area, including precipitation, stratigraphy, topography, soil permeability, and plant cover. All wetlands usually have at least a seasonal abundance of water. This water may come from direct precipitation, overbank flooding, surface water runoff due to precipitation or snow melt, ground water discharge, or tidal flooding. The frequency and duration of inundation and soil saturation vary widely from permanent flooding or saturation to irregular flooding or saturation. Of the three technical criteria for wetland identification, wetland hydrology is often the least exact and most difficult to establish in the field, due largely to annual, seasonal, and daily fluctuations.

Wetland Hydrology Criterion

2.9. An area has wetland hydrology when saturated to the surface or inundated at some point in time during an average rainfall year, as defined below:

1. **Saturation to the surface normally occurs when soils in the following natural drainage classes meet the following conditions:**

   A. **In somewhat poorly drained mineral soils, the water table is less than 0.5 feet from the surface for usually one week or more during the growing season; or**

   B. **In low permeability (<6.0 inches/hour), poorly drained or very poorly drained mineral soils, the water table is less than 1.5 feet from the surface for usually one week or more during the growing season; or**

   C. **In more permeable (≥ 6.0 inches/hour), poorly drained or very poorly drained mineral soils, the water table is less than 1.0 feet from the surface for usually one week or more during the growing season; or**

   D. **In poorly drained or very poorly drained organic soils, the water table is usually at a depth where saturation to the surface occurs more than rarely. (*Note*: Organic soils that are cropped are often drained, yet the water table is closely managed to minimize oxidation of organic matter; these soils often retain their hydric characteristics and if so, meet the wetland hydrology criterion.)**

2. **An area is inundated at some time if ponded or frequently flooded with surface water for one week or more during the growing season.**

(*Note*: An area saturated for a week during the growing season, especially early in the growing season, is not necessarily a wetland. However, in the vast majority of cases, an area that meets the NTCHS criteria for hydric soil is a wetland.)

Summary

2.10. The technical criteria are mandatory and must be satisfied in making a wetland determination. Areas that meet the NTCHS hydric soil criteria and under normal circumstances support hydrophytic vegetation are wetlands. Field indicators and other information provide direct and indirect evidence for determining whether or not each of the three criteria are met. Sound professional judgement should be used in interpreting these data to make a wetland determination. It must be kept in mind that exceptional and rare cases are possibilities that may call any generally sound principle into question.

Appendix B

JOINT STATE/FEDERAL
ADMINISTRATIVE PROCEDURES FOR

THE ESTABLISHMENT AND OPERATION OF WETLAND MITIGATION BANKS IN SOUTH CAROLINA

developed by the

U.S. Army Corps of Engineers - Charleston District

U.S. Environmental Protection Agency - Region IV

U.S. Fish and Wildlife Service - Charleston Ecological Services Office

S.C. Department of Natural Resources

S.C. Department of Health and Environmental Control
(Bureau of Water Pollution Control)
(Bureau of Ocean and Coastal Resource Management)

U.S. Department of Agriculture - Natural Resources Conservation Service

July 1996

JOINT STATE/FEDERAL ADMINISTRATIVE PROCEDURES FOR THE ESTABLISHMENT AND OPERATION OF WETLAND MITIGATION BANKS IN SOUTH CAROLINA

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Attachments

For additional information on mitigation banking and the Mitigation Banking Review Team (MBRT), contact:

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JOINT STATE/FEDERAL ADMINISTRATIVE PROCEDURES FOR THE ESTABLISHMENT AND OPERATION OF WETLAND MITIGATION BANKS IN SOUTH CAROLINA

I. PURPOSE AND SCOPE:

This document provides coordinated state/federal guidance on the development and operation of freshwater wetland mitigation banks in the State of South Carolina, the area for which the offices of the participating agencies have jurisdiction.

This guidance is provided to assist the participating agencies, bank sponsors and other interested parties in meeting the goals of the Clean Water Act and the goals of the State of South Carolina to restore and maintain the chemical, physical, and biological integrity of the Nation's waters and wetlands and associated natural resource values.

In addition to mitigation banks, the procedures and policies setforth in this document will also be used to site other forms of off-site mitigation and to establish mitigation ratios and documentation requirements.

II. DEFINITIONS

For the purposes of this guidance, the following terms are defined:

Banking Committee: A group comprised of one principal representative from each appropriate State and Federal regulatory or resource agency and may also include ex-officio agency representatives, members of environmental organizations, and other participants. The primary purpose of the committee is the establishment and periodic review of this Memorandum of Agreement, policies for defining bank credits and debits, and the State strategy for mitigation siting and off-site mitigation.

Banking Instrument: Document drafted by the bank sponsor in coordination with the Mitigation Bank Review Team (MBRT) to describe in detail the physical and legal characteristics of the bank, and how the bank will be established and operated. The document is subject to concurrence of the MBRT and is the enabling document for the bank.

Bank Sponsor: Any public or private entity responsible for establishing and, in most circumstances, operating a mitigation bank.

Compensatory Mitigation: For purposes of this MOA, the restoration, enhancement or in exceptional circumstances, preservation or creation of wetlands and/or aquatic resources expressly for the purpose of compensating for adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Compensation Requirement: The type and number of mitigation credits required to offset wetland impacts resulting from a proposed project for which compensation is required.

Consensus: A process by which a group synthesizes its position to form a common collaborative agreement acceptable to all members.

Creation: The establishment of a wetland where one did not formerly exist (e.g. convert an upland to wetland).

Credit: A unit measure representing the accrual or attainment of aquatic and/or wetland functions at a mitigation bank. Credit measurements may be in the form of acres of wetlands, habitat units or other functional units.

Debit: A unit measure representing the compensation requirement arising from the loss of aquatic and/or wetland functions due to a construction activity at an impact or project site or other wetland impact that reduced/eliminates the area's ability to perform existing functions. In a given bank, debit units should be in the same form as credit units and be determined using the same assessment method.

Debiting Plan: A portion of the banking instrument which defines the formulas and processes for translating compensation requirements into debits. Unless otherwise specified, the MBRT will use the most current edition of the U.S. Army Corps of Engineers - Charleston District's Standard Operating Procedure for Compensatory Mitigation Plan to define the formulas and process.

Enhancement: Activities conducted in or contiguous to existing wetlands or other aquatic resource areas to achieve specific management objectives or provide conditions which previously did not exist, and which increase one or more aquatic functions.

Function: Any number of physical or biological processes which take place in wetland areas. Commonly recognized functions are food chain production, provision of fish and wildlife habitat, shoreline protection, storm and floodwater storage, groundwater recharge and discharge, and water quality maintenance.

In-Kind Compensation: The replacement of the functional losses at the impacted site with a functional gain in wetland type possessing the same physical and biological characteristics.

MBRT: See "Mitigation Bank Review Team"

Mitigation: The lessening of the adverse environmental impacts of a development project which includes a process to avoid, minimize or compensate for the impacts of the development projects. Mitigation includes the following considerations, listed sequentially: (a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree of magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments. *An alternative analysis of locations is often an element of this process.*

Mitigation Bank: A site where wetlands are restored, enhanced, created, and/or preserved expressly for the purpose of providing compensatory mitigation.

Mitigation Bank Review Team (MBRT): The interagency group of Federal, State, or local regulatory and resource agency representatives whose agencies are signatory to a banking instrument and monitor the establishment, use and operation of a mitigation bank.

Operation: The actual conduct of credit withdrawal transactions in a functioning wetland mitigation bank in order to compensate for unavoidable wetland losses. Operation also includes activities such as monitoring, remediation, etc. In order to operate a bank, it first must be proven to be successful based upon the bank's specific pre-established success criteria.

Out-of-Kind Compensation: Replacement of a specific wetland type with wetlands possessing different physical and biological characteristics.

Priority Management Areas: Areas of the State identified by the S.C. Department of Natural Resources, S.C. Department of Health and Environmental Control, U.S. Fish and Wildlife Service, National Marine Fisheries, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers and other entities as specific target areas for the preservation, restoration and/or enhancement of natural resource values. These areas may be associated with wildlife refuges, heritage trust sites, national estuarine sites, wildlife habitat focus areas, and other similar habitat management programs and high risk wetland sites.

F+W, DNR, ACE, NMF, DHEC, OCRM, NRCS

Practicable: Feasible and possible to practice or perform. Available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes.

Preservation: The protection of ecologically important wetlands or other aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms. Preservation may include protection of upland areas adjacent to wetlands as necessary to ensure protection and/or enhancement of the aquatic resource.

Restoration: Re-establishment of previously existing wetland or other aquatic resource character and function(s) at a site where they have ceased to exist, or exist only in a substantially degraded state.

Service Area: Based on hydrologic, edaphic and biotic criteria, the designated area (service unit) wherein a bank can reasonably be expected to provide appropriate compensation for impacts to wetlands and/or aquatic resources.

Service Unit: Defined for the purpose of mitigation management as a geographical grid formed using the major soil groupings of the State which are oriented basically parallel to the coast, overlain by the four major river basins of the State (Savannah, Ashepoo-Combahee-Edisto, Pee Dee, and Santee), which are oriented basically perpendicular to the coast. Each resulting unit is defined as a service unit which defines the area or areas which can be serviced by a mitigation bank (see Attachment B).

Success Criteria: The standards required to meet the objectives for which a bank was established such as, but not limited to, hydrology, soil condition and vegetative community. The success criteria is specific to each banking agreement.

Wetlands: Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. For the purposes of this guidance, the U.S. Army Corps of Engineers' current delineation guidelines will be used to identify and/or delineate wetlands.

III. MITIGATION BANKING POLICY

A. National policy and regulation establish criteria for mitigation which must be met for activities to be permitted under Section 404 of the Clean Water Act. These criteria are found in the Section 404(b)(1) guidelines, and in the "Memorandum of Agreement (MOA) between the EPA and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines" (February 6, 1990). The U.S. Fish and Wildlife Service Mitigation Policy (January 23, 1981), provides Service policy guidance which can be referenced in establishing criteria for mitigation banks. A Memorandum to the Field signed August 23, 1993, (Regulatory Guidance Letter 93-2) and the most current Federal Guidance for the "establishment, use and operation of mitigation banks" published in the Federal Register, set forth a framework for federal regulatory and resource agency policy for the establishment and use of mitigation banks.

The existence of a mitigation bank will not be used as a substitute for an alternatives analysis. Moreover, it is important to recognize that there are circumstances where the impacts of a project are so significant that even if alternatives are not available, the discharge may not be permitted regardless of the compensation proposed.

B. It shall be the policy of the undersigned agencies that mitigation banking may be an appropriate form of compensation for the following projects and/or under the following circumstances:

1. Projects that have met the avoidance and minimization sequencing criteria and can be clearly demonstrated by the applicant to have: (1) no practicable on-site mitigation opportunities and off-site mitigation has been determined to be appropriate, (2) limited on-site mitigation opportunities where a mixture of on-site and off-site mitigation is needed to meet mitigation requirements, or (3) off-site mitigation would clearly by more environmentally beneficial than the use of on-site mitigation.

2. Categories of projects identified by the agencies which are appropriate for mitigation through mitigation banks without consideration of on-site mitigation, such as minor impacts associated with home construction on a private single family lot which is not part of a subdivision.

3. Linear projects, such as highways or pipelines, that generally result in numerous minor impacts, which cumulatively could be considered more than minimal.

4. Projects with substantial adverse impacts that cannot be mitigated on site will be reviewed on a case by case basis to determine the most environmentally beneficial method of mitigation.

C. After the fact projects and unauthorized projects. After the fact projects and unauthorized projects that cannot be mitigated on site as defined in B. above may be debited at higher ratios than pre-approved projects because of the difficulty of determining the pre-impact form and function of the wetland.

D. Utilization of mitigation banks. Once off-site mitigation has been determined acceptable for a given project, the applicant may choose the mitigation bank or propose other off-site alternatives to be utilized for compensatory mitigation in accordance with the procedures setforth in this document.

E. Applicable Environmental Laws and Regulations. Projects deemed appropriate for off-site compensation in a mitigation bank must demonstrate full compliance with existing Federal statutes and regulations as well as consistency with applicable policies, including, but not limited to:

1. Clean Water Act [33 U.S.C. 1251 et seq.].

2. National Environmental Policy Act [42 U.S.C. 4321 et seq.] and implementing regulations.

3. The Fish and Wildlife Coordination Act [16 U.S.C. 661-666(c)].

4. The Rivers and Harbors Act of 1899 [33 U.S.C. 403].

5. Section 404(b)(1) Guidelines [40 C.F.R., Part 230]; including interpretations of the Guidelines in the Memorandum of Agreement between EPA and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines [February 6, 1990].

6. Federal Permit Regulations [33 C.F.R., Part 320 to 330] including interpretive guidance provided by the U.S. Army Corps of Engineers.

7. Magnuson Fishery Conservation and Management Act [16 U.S.C. 1852]

8. Coastal Zone Management Act [16 U.S.C. 1451 et. seq.]

9. S.C. Coastal Management Program [SCCMP, ratified by S.C. General Assembly February 19, 1979 (Ratification No. 19)]

10. S.C. Regulation 61-101, Water Quality Certification.

11. Endangered Species Act, as amended [16 U.S.C. 1531-1543]

12. Federal Agriculture Improvement and Reform Act of 1996 [7 U.S.C. 7201]

F. Basic Standards for Mitigation Banks:

1. Each mitigation bank must be supported by a formal, written banking instrument, developed in cooperation with the MBRT, that includes all involved parties as signatories. This instrument may be in the form of a Memorandum of Understanding (MOU) or other document as applicable, and should contain the information contained in Attachment A, the basic outline of a banking instrument. Depending upon the nature of the bank, a permit for wetland alteration may be required as a condition of the banking instrument.

2. Mitigation banks generally must be functioning, consistent with the success criteria developed for each particular bank, prior to the withdrawal of credits. In certain instances, limited withdrawal of credits may be allowed prior to demonstrating functional success. All of the following requirements must be satisfied prior to pre-function early credit withdrawal: (a) the bank sponsor has performed a functional assessment on the bank site and demonstrated to the MBRT that the site has a high probability for functional success; (b) banking instrument and final mitigation plans have been approved; (c) bank site has been secured; and (d) appropriate financial assurances have been established.

3. It is the responsibility of the applicant (entity seeking mitigation credit) and/or the bank sponsor to demonstrate to the permitting agencies that project-related impacts will be successfully offset prior to use of the bank.

4. Generally, in-kind compensation is preferable to out-of-kind compensation unless the out-of-kind ecosystem is one which is generally regarded to be more desirable than the impacted ecosystem as determined by the permitting agencies.

5. Mitigation bank credits used for a particular project must provide maximum practicable replacement of the (otherwise uncompensated) functions lost as a result of the activity (i.e., no overall net loss of functions).

6. Where impacts from an activity will be offset by reliance in whole or in part on a mitigation bank, the permit or certification shall include purchase of bank credits as a condition.

7. Individual site-specific banking agreements must specify that the bank sponsor is responsible for the long-term success, perpetual protection and/or passive management of the bank or for providing alternative compensation if the bank fails.

8. Individual site-specific banking agreements must authorize Right-of-Entry to any representative of the MBRT.

IV. IMPLEMENTATION PROCEDURES

A. It is imperative that all participants in the banking process understand how the bank is to be sited, constructed and operated. The criteria developed below are intended to minimize the potential for misunderstanding while adding predictability to the process.

B. Coordination. Parties interested in establishing a mitigation bank should follow the steps below when coordinating bank development.

1. Identify the bank sponsor.

2. Contact the MBRT via the U.S. Army Corps of Engineers or the USDA Natural Resources Conservation Service to participate in planning of the mitigation bank (i.e. site selection, development plan design, success criteria designation, monitoring and remediation plan development, etc.)

3. Identify the parties responsible for acquiring, developing, managing and monitoring the mitigation bank site, including the responsibility for accounting of bank credits.

4. Develop an individual mitigation banking instrument (see Attachment A) in coordination with the MBRT.

C. Development of Individual Mitigation Banking Agreements. A written mitigation banking agreement is central to the successful establishment of each individual mitigation bank because it formalizes consensus among the signatory parties with respect to site selection, development and operation of the bank. Without this interagency consensus, some of the benefits potentially derived from banking are foregone, including reduced permit processing time and increased predictability in the permitting process.

1. Individual site-specific banking agreements must, at a minimum, address the elements identified in Attachment A, to include identification of: (a) members of the participating agency; (b) entities responsible for acquiring, developing, managing,

operating and monitoring the mitigation bank, to include the responsibility for accounting of bank credits; (c) design of the bank development, management and post-construction monitoring plan; (d) detailed success criteria; (e) specific remediation plans in the event the bank fails to fully satisfy the success criteria; and (f) a legally binding mechanism (i.e., conservation easement or deed restriction) to insure that no interest in the property can be conveyed which would jeopardize the objectives of the bank or the continued protection and/or function of the wetland system.

2. The MBRT shall evaluate and seek MBRT consensus regarding all major elements of the banking proposal. Typically, such major elements include bank siting, bank development plans, bank success criteria, bank usage criteria, credits available within the bank, requirements for monitoring plans and reports, and contingency and remediation plans. Any major element which the MBRT does not reach a consensus agreement on may require use of the dispute resolution procedures specified in this document.

3. Individual site-specific banking agreements must specify that the mitigation bank developers/managers are accountable for all bank-related project costs including costs associated with acquisition, administration, development, management and maintenance, long-term monitoring, and, where applicable, remedial measures. Procedures and funding sources should be identified in the agreement for undertaking the above activities.

4. Based upon the specific success criteria for a bank, individual site-specific banking agreements must also specify that if the condition of the bank changes and all or part of the bank stops providing the intended functions (i.e., partial or total failure of the bank) following approval of credit withdrawal, the MBRT will suspend the agreement to allow use of the bank. Following remedial action, use of the bank may be resumed, subject to approval of the MBRT.

D. Criteria for the Siting and Design of Mitigation Banks:

1. In general, selection of a mitigation bank site should be based on restoration, enhancement, preservation or creation potential (i.e., soil type and water availability), existing resource value, size, location, cost, adjacent land uses, presence of contaminants, potential for human intrusion and the ability to protect aquatic and/or wetland functions over the long-term.

2. Potential bank sponsors should place a high priority on siting banks in previously drained or degraded forested wetlands that could be restored or enhanced. The MBRT recognizes that the majority of past wetland impacts within the State have been in wooded wetland systems and this trend is expected to continue. Due to this

trend, banks that focus on the restoration of forested wetlands would be expected to more often have in-kind mitigation credits available. Restoration of forested wetlands would also be expected to result in a higher potential for the development of bank credits. However, it is important to recognize that certain in-kind functions of specific wooded wetland types will not be met through a bottomland hardwood bank (e.g., scrub-shrub pocosins, savannahs, headwater streams, piedmont streams and associated bed and bank systems, etc.) To recoup functions of these systems, habitat-specific banks may be needed, or project by project individual compensatory mitigation may be required.

3. To the maximum extent possible, mitigation banks should be located in the same service unit as anticipated impacted sites (see Attachment B). The following guidance would apply to proposals for a service area that would include out of service unit credit use:

a. Use of credit from a bank located in one service unit will generally not be considered acceptable as mitigation for an impact in an adjacent service unit. However, in certain instances, the MBRT may determine that out-of-service unit credit use would be the most environmentally beneficial method of mitigating a particular impact.

b. Use of credit will generally be considered acceptable for the portion of each watershed that is located within a single service unit. There will generally be an associated incremental increase in the applicable credit ratio required to mitigate an impact for each watershed sub-basin boundary that is crossed between the bank and the impact site, and a distance factor may be defined in the banking instrument.

c. The State of South Carolina has identified a number of priority management areas located throughout the State (also addressed in Attachment B). Wetland mitigation banks located within or adjacent to these area will be encouraged.

4. Selection of a former wetland as a mitigation bank site and restoring the site increases the likelihood that a wetland will develop. Every effort should be made to establish banks on former wetland sites prior to attempting to establish banks on sites that require wetland creation as a portion of the bank. In those cases where wetland creation is undertaken, strong consideration should be given to establishing mitigation banks on sites that have minimal existing ecological values. Wetland creation as the sole method of establishing a mitigation bank will not generally be accepted.

5. Preservation of existing wetlands and/or upland buffers will be considered when it is proposed in conjunction with restoration, enhancement and/or creation of wetlands; or when the mitigation bank or other form of off-site mitigation is enhancing a State

priority management area (see Attachment B). Preservation of existing wetlands will be allowed on a case by case basis in these circumstances.

6. Whenever possible, mitigation banks should incorporate management strategies that contribute to overall water quality improvements in the ecosystem and that protect the ecological integrity of adjacent habitats (e.g., use of buffers, acquisition of easements). Where practicable, provision should be made for fish and wildlife migrational corridors between mitigation banks and other high quality aquatic and upland habitats. In addition, mitigation banks should be designed to reduce negative impacts that may result from the location of low-quality habitats immediately adjacent to high quality habitats.

7. Mitigation banks should be ecologically and administratively self-sustaining. Every effort should be made to avoid establishing banks which require regular and intensive maintenance. Exceptions should be made only when the MBRT determines that adequate procedures exist to insure the permanent viability of the bank site.

8. Mitigation banking instruments shall contain a schedule and criteria governing withdrawal of credits from the bank. It shall specify the maximum credit withdrawals allowed prior to interim or final success determinations, as appropriate. Permitting agencies shall assure that withdrawal of credits from a bank will be in accordance with the schedules and criteria contained in the banking agreement.

9. To evaluate the long term success of operational mitigation banks, annual monitoring and reporting will generally be required for the first five years of bank operation. Thereafter, reporting should be continued at a regular interval, to be determined by the MBRT. Monitoring should provide sufficient written and graphic descriptions of bank conditions for the banking committee to evaluate the effectiveness of bank management and verify the availability of compensation credits. Reporting requirements may be discontinued after all credits have been withdrawn from the bank, provided that a minimum of five years has elapsed since the bank was determined to be functioning successfully.

E. Criteria for Operation of Mitigation Banks:

1. The MBRT will monitor operation of the bank.

2. Prior to use of the mitigation bank, the MBRT will determine if the bank is functioning, consistent with the success criteria specified in the bank instrument.

3. The bank sponsor will propose and utilize an assessment methodology [e.g. Hydrogeomorphic (HGM), Habitat Evaluation Procedures (HEP), or Corps' Standard

Operation Procedures (SOP) for Mitigation as approved by the MBRT] to determine the projected credits to eventually be available in a specific bank. The MBRT, based on review of monitoring reports and/or site inspections, will determine the exact number of available credits within the bank.

4. Based on the bank sponsors method of assessment, the MBRT will establish a process or formula (debiting plan) for translating compensation requirements into debits. Unless otherwise specified the MBRT will use the current U.S. Army Corps of Engineers - Charleston District's Standard Operating Procedures for Compensatory Mitigation Plans for establishing the debiting plan.

5. During the permit review process the applicant and/or the bank sponsor will perform an assessment of the project site in order to determine the necessary compensation required for a proposed project. This assessment methodology must be the same that was used to assign credit to the bank.

6. The MBRT will use the established process or formula (debiting plan) for translating compensation requirements into debits on a project by project basis.

F. Dispute Resolution. Dispute resolution will be addressed in accordance with current federal guidance. However, a bank established without agency consensus is of little value. The guidance document should be realistic and acknowledge that some proposed mitigation banks are of little value and should not be pursued.

V. OTHER PROCEDURES

A. This guidance may be subject to change subsequent to the receipt of additional national guidance on this issue.

B. Within one year of issuance, the Banking Committee will review this guidance for adequacy, applicability and/or acceptability. Any proposed modifications, additions of deletions to this guidance will be considered by the Banking Committee, and upon consensus, necessary changes will be made. Thereafter, review will take place at a minimum every two years.

C. Nothing in this guidance is intended to diminish, modify, or otherwise affect the statutory or regulatory authorities of the agencies involved.

D. Subsequent guidance related to the development and operation of mitigation banks will be issued as the need arises.

VI. EXISTING APPROVED MITIGATION BANKS

At the drafting of this document, four mitigation banks have been approved and permitted by state and federal agencies: (1) Vandross Bay, a private bank in Georgetown County, (2) Faulkenberry, a State bank in Clarendon County for use by the S.C. Department of Transportation, (3) Sandy Island, a State bank in Georgetown County for use by the S.C. Department of Transportation, and (4) Friends' Neck, a private bank in Kershaw County. These banks, as permitted, will operate in accordance with their permitted procedures and previously defined service areas.

-- End --

ATTACHMENT A

BASIC OUTLINE OF MITIGATION BANKING INSTRUMENT
COVER PAGE

1. Purpose of the document.
2. Title of document and official name of bank.
3. List of signatories.
4. Effective date.

I. PREAMBLE

1. Purpose of bank and it's relationship to Corps and other involved regulatory programs.
2. Location and size of bank, ownership, and identity of bank sponsor.
3. Makeup, role, and responsibility of the MBRT.
4. Mitigation bank goals and objectives.
5. Bank size and classes of wetlands and/or other aquatic resources proposed for inclusion.
6. Type of bank (e.g. single client, general use, joint-project proprietary): identity of sponsor.
7. List of exhibits, including all appropriate supporting technical plans and documents.

II. ESTABLISHMENT OF THE BANK

1. Mitigation Plan
    a. Ecosystem goals.
    a. Description of baseline and reference conditions.
    b. Description of work to be done.
2. Performance Criteria
3. Implementation timetable.
4. Type of real estate interest to be secured by the sponsor.
5. Financial assurances to be secured by the sponsor.
6. Provisions covering long term use of the land (incompatible activities), transfer of ownership of bank lands and/or easements.
7. Debiting Plan (crediting and debiting procedure).
8. Types and amounts of credits projected to be available at designated time intervals.

III. OPERATION OF THE BANK

1. Provisions for sale and transfer of credits (determination of credit availability, timing of credit withdrawal and factors to be considered in determining compensation ratios).
2. Types of projects or activities that may use the bank.
3. Procedures for release of financial assurance.
4. Provisions for site audits by MBRT.
5. Accounting procedures.

IV. LONG-TERM MANAGEMENT AND MAINTENANCE

1. Type and level of maintenance.
2. Record keeping and monitoring requirements (schedules and techniques, reporting requirements).
3. *Force majeure* clause (identification of catastrophic events beyond sponsor's control).
4. Long-term management responsibilities.
5. Contingency actions in event of partial or total bank failure.
6. Provisions pertaining to validity, modification, and termination of the Banking Instrument.

V. DEFINITION OF TERMS (optional)

VI. SIGNATURE PAGE

SERVICE UNITS FOR MITIGATION BANKING AND OTHER OFF-SITE MITIGATION

(See map on page 2, Attachment B)

Service Unit 1 - Appalachian Region
- A. Savannah (1A)
- B. Saluda (1B)

Service Unit 2 - Piedmont
- A. Savannah (2A)
- B. Santee (2B)
- C. Pee Dee (2C)

Service Unit 3 - Sandhills
- A. Savannah (3A)
- B. Ashepoo, Combahee, Edisto (3B)
- C. Santee (3C)
- D. Pee Dee (3D)

Service Unit 4 - Coastal Plain
- A. Savannah (4A)
- B. Ashepoo, Combahee, Edisto (4B)
- C. Santee (4C)
- D. Pee Dee (4D)

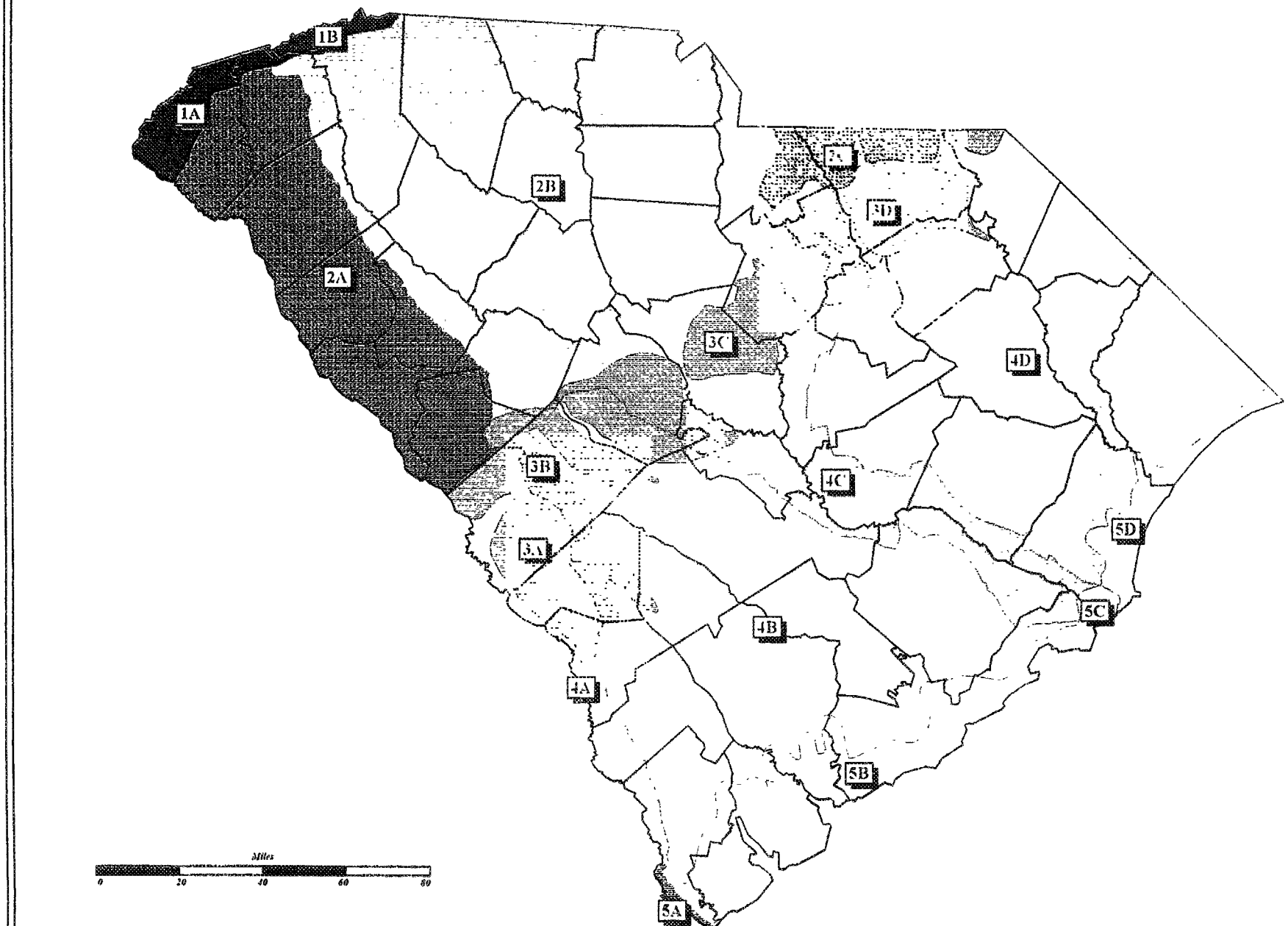
Service Unit 5 - Lower Coastal Plain (Outside of the State's Critical Area)
- A. Savannah (5A)
- B. Ashepoo, Combahee, Edisto (5B)
- C. Santee (5C)
- D. Pee Dee (5D)

Note: Service units are based upon the General Soil Map of South Carolina (SCS soil map 48) and the Hydrologic Unit Map of South Carolina (SCS September 1981 4-R-37669)

PRIORITY MANAGEMENT AREAS

Priority management areas are areas of the State identified by State and Federal natural resource agencies as specific target areas for the preservation, restoration and/or enhancement of natural resource values. While a specific list has not been compiled at this time, these areas may be associated with wildlife refuges, heritage trust sites, national estuarine reserves, wildlife habitat focus areas, outstanding resource waters and similar habitat management programs areas. High risk wetlands associated with rapidly growing urban areas may also be included in this category. For the present, any questions regarding potential mitigation sites and their association with priority management areas should be brought before the MBRT.

SERVICE UNITS FOR MITIGATION BANKING AND OTHER OFF-SITE MITIGATION



Appendix C: Culvert and Ditch data for Sawmill Branch Canal Study Area

File #	Station	Culvert	Water	Height	Vegetation	Source	Other
R0502116A	D1	Large	Flowing	8 ft	Thick	wetland	Well developed meandering creek
R0502116C	D2	concrete 1 ft	stagnant		Thick	wetland	Ends at Lipton St. 30 yds from path
R0502117A	D3	2 ft + 1/2 PVC	stagnant	1 ft	grassy	neighborhood	connects with drainage from neighborhood runs along Lipton St.
R0502117B	D4	none	stagnant	1 ft	grassy	neighborhood	connects to D3 ditch runs between property and wetland
R0502117C	D5	3 ft	no flow		Thick	35 ft to source	Point gathered at Corley St.
R0502117D	D6	concrete 4 ft	pooled wtr in ditch		Thick	neighborhood	runs along property
R0502117E	D7	new black 4 ft	little flow	3 ft	Thick		60 ft in then parallels trail to La Cretia and Corly
R0502118A	D8	1 1/2 ft	no water		extremely thick	wetland	no traceable ditch pattern or creek
R0502118B	D9	stainless steel 2 ft	deep flowing water		extrm thick	wetland	slumping and scouring due to drainage of water under path
R051120A	D10	blck plastic 3 ft	flowing water	6 ft	thick	wetland	creek meanders into wetland
R051120B	D11	stainless steel 2 1/2ft	no flow	6+ ft.	Thick	wetland	deep narrow creek, water pooled at entrance to culvert
R051120C	D12	stainless steel 2 ft	no water	2 ft.	Thick	wetland	channel raise above path at source
R051120D	D13	black plastic 2 ft	no water	1 ft	thick	wetland	export culvert not found
R051120E	D14	stainless steel 3 ft	no flow	2 ft.	Thick	wetland	no apparent creek
R051120F	D15	black plastic 2 ft	flowing water	5 ft	Thick	wetland	Deep creek well developed
R051120G	D16	blck plastic 3 ft	no flow	3 ft	Thick	wetland	creek wide, well developed
R051121A	D17	blck plastic 2 ft	no flow	2 ft.	very thick	wetland	developed creek
R051121B	D18	blck plastic 2 1/2 ft	no water	3 ft	extrm thick	wetland	trees overlay creek
R051121C	D19	blck plastic 2 ft	no water	3 ft	thick	wetland	pipe extends out from bank over channel
R051121D	D20	none	flowing water	3 ft	little	school and trailer park	long wide developed ditch. Dead ends to two large 6 ft pipes
R051121E	D21	none	little stagnant water	3 ft	little	school	ditch runs into D20

R051121F	D22	steep pipe 3 ft	flowing water	4 ft.	little		Two pipes feed into main culvert next to CPW shack ditch runs into gated complex
R051121G	D23	stainless steel 3 ft	flowing water	12-15 ft	thick		large developed creek
R051121H	D24	blck plastic 2 1/2 ft		6 ft	thick		no point found on GPS
R051122A	D25	blck plastic 2 1/2 ft	pooled wtr in ditch	3 ft			entrance to pipe covered with dirt NO POINT FOUND 100 yds from last
R051122B	D26	stainless steel 2 1/2	pooled wtr in ditch	5 ft	thick		no point found on GPS 100 yds from previous
R051122C	D27	none	no flow		grassy	runoff from street and wetland	
R051122E	D28	none	no flow		thick		other side of bridge ditch runs into wetland
R051122F	D29	stainless steel 5 ft	no flow		thick	wetland	
R051122G	D30	stainless steel 4 ft	no flow	6 ft	thick	wetland	
R051122H	D31	3 ft	flowing water	6 ft	thick		developed creek pipe exports at base of channel
R051122I	D32	stainless steel 4 ft	no flow		thick		exports at base of channel
R051122J	D33	stainless steel 3 ft	no flow	5 ft	very thick		trees overlay creek
R051122K	D34	stainless steel 3 ft	no flow	6 ft	thick		
R051122L	D35	stainless steel 5 ft	no flow	12 ft	thick		stagnant water along ditch
R051122M	D36	stainless steel 3 ft	no flow				
R051122N	D37	concrete 4 ft	flowing water				next to first bridge crossing
R051122O	D38	stainless steel 3 ft	no flow	5 ft	thick		
R051123A	D39	concrete 4 ft	small flow	7+ ft	very thick		thick veg obscures ditch
R051123B	D40	stainless steel 2 ft	flowing water	8 ft	very thick		developed creek
R051123C	D41	none	no flow	8 ft			
R051123D	D42	stainless steel5 ft	no flow	6 ft	thick		
R051123E	D43	stainless steel 5 ft	no flow	6 ft	thick		stagnant water along ditch
R051123F	D44	stainless steel 5 ft	flowing water	12 ft	thick		developed meandering creek
R051123G	D45		flowing				drains from

			water				neighborhood behind Piggly Wiggly
R051123H	D46	none	no water		none	Piggly Wiggly	cement drainage ditch
R051123I	D47	black plastic 2 1/2 ft	no flow			Speedway Gas station	
		concrete 2 1/2 ft	no flow			Road at start of path	